SESSIONAL PAPER 1961—5

TERRITORY OF WESTERN SAMOA

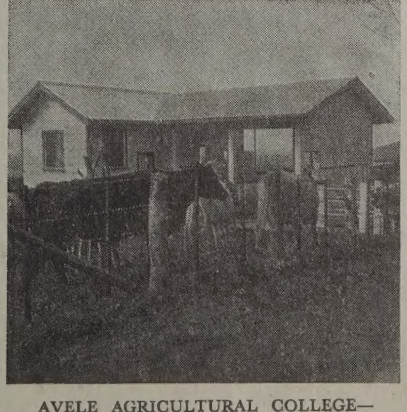
DEPARTMENT OF AGRICULTURE, FORESTS, AND FISHERIES

ANNUAL REPORT

for

1960

APIA, WESTERN SAMOA, 14 FEBRUARY 1961



AVELE AGRICULTURAL COLLEGE—
MODEL DAIRY

FALE TAU-SUSU FAATA'ITA'I I LE FAATO'AGA A
LE KOLISI I AVELE

COMMONWEALTH MYCOLOGICAL INSTITUTE
-3 JUL 1961

DEPARTMENT OF AGRICULTURE, FORESTS, AND FISHERIES

13 February 1961

The Hon. Tualaulelei Mauri, Minister of Agriculture, Forests, and Fisheries.

Sir,

ANNUAL REPORT 1960

In accordance with section 14 of the Agriculture, Forests, and Fisheries Ordinance 1959 I have the honour to submit herewith the Annual Report of the Department for the year 1960.

I have the honour to be, Sir,

Yours faithfully,

B. E. V. PARHAM, Director of Agriculture.

ACKNOWLEDGMENTS

As in previous years, the Department records with appreciation the continuing assistance and interest of many individuals and institutions at home and abroad. Some of the more important contributions are recorded in the Report including the valuable assistance from the Director of Agriculture, Fiji (Mr J.M. Watson O.B.E.) with technical problems and staff training - from the South Pacific Commission in connection with local investigations on fisheries and on special crops - breadfruit and coconuts in work on which the Department is actively engaged. Also the Secretary-General has generously arranged for a travel grant to enable an officer to undertake special training in Fiji early in 1961.

The Fisheries Officer (Mr H. van Pel) and the Botanist, Fiji Department of Agriculture (Mr J.W. Parham) visited the Territory and provided reports and recommendations. Miss Miller, Principal Research officer of the New Zealand Department of Agriculture visited the Territory to advise on the field procedures for the taking of the F.A.O. Agricultural Census 1960.

The generous cooperation of the U.S.Department of Agriculture Plant Introduction Service at Beltsville - the Director of Agriculture American Samoa, the Executive Director Pacific Science Board (Dr H. Coolidge) and Mr L.W. Wishard of Kamuela, Hawaii is recorded with gratitude.

Locally the Department is indebted to many firms, departments and individuals for interest and assistance and to planters and village authorities for hospitality and encouragement.

Above all, it is proper to record the Department's indebtedness to the Minister of Agriculture (Hon. Tualaulelei M.) for his sustained interest in all aspects of the Department's work. During his period of responsibility many advances have been achieved!

TERRITORY OF WESTERN SAMOA

DEPARTMENT OF AGRICULTURE,
FORESTS & FISHERIES

ANNUAL REPORT : 1960

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TERRITORY OF WESTERN SAMOA

DEPARTMENT OF AGRICULTURE,
FORESTS AND FISHERIES

ANNUAL REPORT FOR YEAR 1960

I. INTRODUCTION

a) New Developments:

1. Developments during the year which are relevant to the progress of agriculture generally and to the more efficient functioning of the department are described in the report. Some of the more important are listed here:

a) the work of controlling the Rhinoceros beetle was assisted by the introduction of a new predator - a beetle named Neochryopus savagei, large numbers of which were liberated over a wide area;

b) a parasite - Chelonus, for the control of the banana scab-moth was successfully introduced and distributed;

c) a first attempt to establish a seedfly parasite for the control of the noxious weed Pseudo elephantopus spicatus was made;

d) the field campaigns to eradicate the bunchytop virus disease and to control leaf-spot disease of bananas were greatly expanded with marked results;

e) field extension services organised the distribution and planting of alternative cash crops including coffee, cocoa, manila hemp, Bixa (Loa) and cashew nuts;

f) several improved cocoa driers were built and operated with good results;

g) at Nafanua further valuable introductions of selected cocoa varieties were made; trials with export crops, capsicum, eggplant, pawpaw and pineapples were continued with useful results;

h) several officers of the Department were selected for overseas training - one to New Zealand on a six months In-service training course; two to the Central Medical School Fiji, one to Fiji for special training in biological control of crop pests and later to U.S.A. on a scholarship for six months intensive study of pest control methods; one to Australia under an Australian Government Scholarship to take a Diploma of Agriculture course at Gatton Agricultural College.

i) two students returned on completion of courses at Massey Agricultural College - one having completed the degree of B.Ag.Sc. and the other a Diploma of Agriculture (Hort.) Both were posted to the Department.

j) at Avele Agricultural College the first group of students to qualify for the Certificate in Agriculture and Animal Husbandry comprised - Western Samoa -- 15; students, Cook Islands - 6; Niue - 2.

k) advances at the College Farm included the construction of model piggeries, poultry house and barn, work shop and office;

l) in the College compound the quarters for two local teachers and one Assistant master were completed and four new dormitories built to replace the old fale-type buildings;

m) the production of bananas for export was adversely affected by a gale in January which damaged plantations throughout the Territory. Growers made a good effort to restore production and there was a very great expansion in Savai'i with the result that 603,000 cases were exported;

n) a third banana shed was constructed at Fagamalo and a store for fertilizers erected in Apia;

o) the first Agricultural show to be held for many years was organised in June in collaboration with the Department of Lands and the Apia Observatory. Large numbers of people showed much interest in the exhibits illustrating the work of the Department and the agricultural activities of the Territory.

Policy and Organization:

2. The established policy and programme of work of the Department was sustained with little change in personnel.

The Animals Ordinance was passed during the year. This provides for the necessary regulations for the proper development of the livestock industries and for the control of importation of animals. Draft Bills were prepared as follows:

Cocoa Export Bill
Cocoa Pests and Diseases Bill

3. The economic development plan which provides for major departmental activities was further considered and a review statement prepared. Progress was limited to availability of funds for development work.

Departmental services were heavily engaged in expanding programmes in the following fields:

1. Control of banana diseases and pests
2. Distribution of fertilizers for bananas
3. Establishment of alternative cash crops
4. Control of rhinoceros beetle in all districts.

SECTION I

AGRICULTURE IN WESTERN SAMOA - 1960

FACTORS AFFECTING PRODUCTION

Climate:

4. Storms and strong winds in January which destroyed over one-third of bearing plantations was a major setback to the banana industry. Recovery in Upolu was slow but growers in Savai'i expanded their plantings and achieved a record production. Towards the end of the year all areas were able to pack to their full allocations

enabling a total of 603,594 cases to be exported for the year.

Other crops did not appear to be so severely damaged by the January storm but production of coconuts and cocoa fell below anticipated levels.

The climatic conditions during the whole year were generally favourable to agriculture.

The meteorological data for the year are at Appendix I.

Market Prices:

5. Downward trends in overseas prices for copra and cocoa continued throughout the year - bananas were unchanged - there was a good local demand for coffee and local market prices for fresh vegetables and fruits were high.

Product	Average Price f.o.b. Apia					Remarks
	1956	1957	1958	1959	1960	
Bananas (per case)	£1.0.9.	£1.2.3	£1.3.0.	£1.3.0.	£1.3.0.	Price to growers 10/- per case plus 6d bonus paid in December.
Cocoa (per ton)	£207	£250	£305	£275	£210	1st grade price to growers 90/- per 100 in December.
Copra (per ton)	£58	£54	£80	£80	£52	Prices to growers 33/- 31/- 28/- per 100 lbs in December

Food Crops:

6. Mainly as a result of weather conditions crops of breadfruit were poor during the first half of the year but later there was a good recovery and in general supplies of locally grown root crops were adequate.

Pests and Diseases:

7. There were no serious outbreaks of any new pests or diseases but the spread of virus disease of bananas in both Upolu and Savai'i resulted in considerable actual loss of crop.

Effects of rhinoceros beetle in many areas appeared to be slightly improved as field sanitation work progressed; but in some estate areas the rapid destruction of palms was cause for considerable concern.

Many more planters themselves undertook spraying for control of pests diseases and weeds, especially for black pod of cocoa, scab moth of bananas, general plantation weeds and also Honolulu rose (Clerodendron) Vae elefane (Elephantopus) and giant sensitive (Mimosa invisa.) Departmental efforts to demonstrate control of leaf-spot disease of bananas were greatly expanded with striking results.

Communications and Transport:

8. The completion of the Taga-Gataivai road in Savai'i was a major advance in assisting the movement of agricultural produce from plantation to market. Also many improvements to subsidiary and feeder roads were of great benefit to banana growers in many districts.

Local shipping suffered some losses and by end of year was hardly able to cope with increasing cargoes of bananas from outer areas.

Overseas shipping was generally adequate for all purposes affecting export of the Territories agricultural production.

THE PRINCIPAL CASH CROPS

9. The total value of main cash crops in 1960 was approximately £2⅓ million - as follows:

Copra	£900,000	- 40 per cent
Cocoa	£750,000	- 31 " "
Bananas	£695,000	- 28 " "
Other	£ 10,000	- 1 " "

Bananas:

10. Total banana exports for 1960 amounted to 603,594 cases. This marked reduction compared with 1959 (of 182,356 cases) can be attributed to the severe storm experienced in January 1960 which laid waste possibly more than half the banana plantings in W.Samoa. Greatest damage was done on the island of Upolu where main production had been in the previous three years. Exposed areas in Savai'i were also seriously affected but fortunately large areas of new plantings in Savai'i were not badly damaged and soon recovered; and Savai'i produced almost 50% of exports.

11. The following table compares quarterly production in Upolu and Savai'i for the year, with percentage of total production by Savai'i.

Summary Quarterly Production Savai'i and Upolu:

	1st Quarter Jan.-March	2nd Quarter April-June	3rd Quarter July-Sept.	4th Quarter Oct.-Dec.	Total
Upolu	101,395	42,916	90,581	128,692	363,584
Savai'i	36,655	63,839	72,550	68,072	241,116
Savai'i as % of total	26.5%	59.8%	44.4%	34%	39.8%

This rapid increase in production in Savai'i put a severe test on local shipping and it was only possible to ship these large quantities due to great efforts on the part of local ship-owners, frequently at quite considerable risk. Despite this, only two shipments failed to reach Apia, one of 500 cases when the M.B. Fa'asalafa was unable to reach Sala'ilua during the January storm and the other of 1030 cases when the M.B. Gaumata'u went on the reef close to Apia.

The years activities have shown however, that there is insufficient local shipping to cope with the increased banana production in Savai'i and most of it is ill-equipped for the job of banana cartage.

12. The following table compares export production for the previous five years.

Year	No. of Shipments	Cases Exported	Value £S.	
			To Growers	f.o.b. Export
1956	-	293,979	132,290	305,000
1957	24	328,569	182,502	351,966
1958	40	884,080	442,040	1,016,692
1959	41	785,950	432,591 (incl.Bonus)	903,842
1960	37	603,594	301,797	694,133

The table shows continuation of a downward trend; but the great majority of this falling behind in production in 1960 occurred in the five months following the January storm. At the same time virus disease of bananas is still having an effect especially on the South-West Coast which is now to all intents and purposes not producing bananas for export.

13. The following table compares district production for 1960 with that for 1959:

District	1959	1960
A. Savai'i:		
Fa'asaleleaga	110,142	121,191
Fagamalo	27,335	31,636
Western Savai'i	52,137	82,218
B. Upolu:		
Aleisa/Lepale	114,219	95,422
S.E.Coast	125,931	76,503
Safata	79,894	32,939
Falealili	74,774	38,385
Lefaga	6,161	798
E. Coast	86,714	69,038
W. Coast	69,614	39,562
S. W. Coast	21,348	1,523
Fagaloa	18,131	16,336

Other details of banana production are given at Appendix 2.

Rejects:

14. Total rejects at Apia for the year amounted to 12,711 cases compared with 25,000 for 1959. The greatest majority of these were rejected for immaturity and many of these cases contained much first class fruit but were spoilt by having included a proportion of immature fruit. There has also been a marked reduction in the number rejected for ripes as most growers have been packing to the capacity of their plantations and with regular shipments there has been little opportunity for mature fruit to appear.

Bonus Payment

15. In December a bonus payment totalling £15,337 was paid to growers for 613,378 cases exported during the period November 30, 1959 to December 1, 1960.

C O C O A

16. In spite of the increasing potential crops arising from the new plantings made in recent years - the progress of the cocoa industry generally was disappointing. There are very large numbers of trees of bearing age, which, due to neglect, produce very little crop - the handling and processing of the beans calls for great improvements, and a much more serious effort by growers. Certain estates made excellent progress, both in the plantations and in the provision of processing and drying equipment; but the average quality of export beans was very poor.

Exports of Cocoa Beans - 1956/60

17. The export of cocoa beans for the past five years is as follows:

Year	Cocoa Beans (Tons)				Shells	Total	
	1st Grade	2nd Grade	Nibs	Total	Tons	All Grades	Value £
1956	..	..	..	3,215	125	3,340	668,171
1957	1,850	979	139	2,968	108	3,076	725,117
1958	2,617	1,089	157	3,963	166	4,029	1,230,881
1959	2,654	1,164	192	4,010	179	4,189	969,860
1960	2,101	1,130	178	3,409	159	3,568	750,000

Other details of cocoa exports are at Appendix 3.

Prices:

18. The average prices for 1st grade cocoa during the past five years have been:

Year	Average value (fob) £.
1956	£207.0.0.
1957	250.0.0.
1958	305.0.0.
1959	275.0.0.
1960	210.0.0.

Quality of Cocoa Exports:

19. There was a decrease of the order of 7 per cent in the overall quality of beans exported: 1st grade, 59 per cent; 2nd grade 32 per cent; Nibs and shells 9 per cent - at times sales of second grade were difficult to arrange and complaints from overseas buyers increased.

20. During the year 416 cocoa trading licences were issued (increase of 22 over previous year) and 54 persons were prosecuted for breaches of the regulations, with fines totalling £190.

COCONUTS AND COPRA

21. The planting of coconuts was again inadequate to provide replacement for losses due to age and other causes. In a few districts new areas were established and one private plantation established 200 acres. The distribution of seed coconuts from a nursery established by the General Manager, Western Samoa Trust Estate Corporation at Apia has been arranged.

COPRA EXPORTS 1956-60

22. Trends in the export of copra over the past five years are shown in the following table:

Year	Tons Shipped				Value (fob) £	Remarks
	H.A.D.	S.D.1.	S.D.2.	Total		
1956	1,256	12,160	..	13,581	817,494	
1957	2,598	2,978	8,748	14,325	811,441	
1958	3,827	5,653	4,075	13,731		
1959	8,442	4,890	3,508	16,840	1,400,000	
1960	9,959	2,464	2,110	14,834		includes 301 tons from Tokelau Is.

The decrease of nearly 2,000 tons may be attributed to the effects of adverse weather early in the year and to the reduced prices throughout the year. The total approximate value of the year's production was £900,000. An increase in the proportion of first grade copra was recorded - i.e. 80 per cent of the total. The successful establishment of small driers capable of handling over 66 per cent of the total production is largely due to the efforts of departmental field staff. Many licences (54) were issued for the processing of copra and a detailed inspection of all driers carried out. Also 460 copra trading licences were issued and 72 persons were prosecuted and fined £247 for dealing in substandard copra.

Other details of the export of copra which continued to be handled by the Copra Board are given at Appendix 4.

OTHER EXPORT CROPS

23. The department continued to encourage the export of several export crops and much useful information was obtained from trial shipments of coffee, capsicum, eggplants, pawpaws, citrus, pineapples, dried bananas, annatto (loa) and avocados.

Details of these and other produce exported mainly to New Zealand and American Samoa are given at Appendix 5.

PASTURE AND FODDER CROPS

24. The development of grazing land by the planting of improved grasses and legumes continued satisfactorily - but weed control in pastures still remains a major source of trouble and expense. There were extensive plantings of elephant grass in grazing areas on Western Samoa Trust Estate Corporation and other plantations and the areas under Batiki blue grass and Centrosema were increased.

II LIVESTOCK AND FISHERIES IN W.SAMOA

25. With the appointment early in the year of an Agricultural officer with experience in various aspects of animal husbandry it was possible to re-establish and extend departmental services. The report of Mr J. Holterman ten Hove provides the following information of general interest - details of departmental services are given elsewhere in the report.

Animal Imports and Exports: The following are the figures for 1960:

	Pigs	Poultry	Horses	Cattle	Dogs	Cats	Birds
Imports:	44	1,529	1	9	8	2	Nil
Exports:	144	106	Nil	1	Nil	Nil	2

Amongst those animals imported were one pure bred stallion, 5 pure bred Hereford bulls, 3 Zebu polled Angus cross bulls, 2 pure bred large white gilts, 1 pure bred large White boar, 1155 day-old chicks, 328 pullets, 25 Turkey chicks, 3 guinea fowls. These animals were imported from New Zealand, Fiji, Eastern Samoa and Tonga.

Livestock Population:

26. As there are no accurate statistics of livestock available, the following figures, prepared for the annual questionnaire of the Food and Agriculture Organization, are estimated:

	1957	1958	1959	1960
Horses	3,000	3,500	3,100	3,500
Asses	150	200	240	270
Cattle:				
Dairy	500	600	600	550
Beef	13,100	13,600	14,000	14,650
Pigs	60,000	60,000	65,000	68,000
Sheep	N.A.	33	12	6
Goats	N.A.	200	200	250
Poultry:				
Fowls	250,000	380,000	400,000	410,000
Ducks	600	600	650	700
Geese	100	100	130	150
Turkeys	N.A.	50	75	100

Animal Production: Beef & Pork

27. Although the total beef and pork production of cattle and pigs slaughtered in the Territory cannot be assessed, the following figures however are provided by the Department of Health and indicate only the animals slaughtered at the W.S.T.E.C. slaughter house.

BEEF				PORK			
Year	Number	Average Weight (lbs)	Total Weight (lbs)	Year	Number	Average Weight (lbs)	Total Weight
1956	2150	350	860,000				
1957	2500	350	874,000				
1958	2454	352	863,808				
1959	1813	350	634,500	1959	103	75	7,725
1960	1745	390	684,060	1960	124	80	9,920

Hides:

28. The export of hides increased again and although the quality continues to be satisfactory, a higher price could be obtained overseas if more care was paid to the skinning and preparation of hides.

Exports over the past 5 years has been:

Year	Hides exported		Export Value (£)
	Number	Weight (lbs)	
1956	1,136	45,440	405
1957	2,677	87,080	5,250
1958	2,621	87,000	5,242
1959	1,543	46,220	3,086
1960	1,678	60,530	3,356

Milk:

29. The estimated amount of fresh milk produced in the Territory over the past three years is:

1958	45,000 gall.
1959	46,000 "
1960	46,500 "

Poultry:

30. There appears to be a great demand for local produced eggs, and as the few local poultry farmers cannot satisfy the egg consumers, there is still plenty of scope for the development of the poultry industry. One poultry farmer imported a batch of 25 turkey chicks merely as an experiment and if proved successful, some further importations are to be made.

Avele Agricultural farm established a poultry section which will mainly be used for demonstration purposes.

The ban on the import of poultry carcasses from countries where Newcastle disease prevail and which ban was imposed at the end of 1959, has now been lifted in so far that only A-grade carcasses, accompanied with a health certificate can be imported from those countries.

Fisheries Development:

31. The South Pacific Commission Fisheries officer Mr H. van Pel visited the Territory and initiated investigations on marine fisheries. His report with recommendations was received late in the year and a second visit proposed for November had to be cancelled.

Details of departmental activities are described later in this Report. (para. 124)

No commercial fishing on a large scale is done in the Territory and only the fishermen of villages round Apia, together with a few fishermen on the East and West Coast of Upolu, sell their surplus fish at the "fishtree" in Apia or to a lesser extend to local stores.

Although it is estimated that 2,100 tons of fish and other marine animals were taken from the sea and inland waters of Western Samoa, a considerable quantity of frozen and fresh fish is imported from New Zealand and American Samoa.

Besides these imports also a tremendous lot of canned fish is imported. Considering these fish importations and the fact that not enough fresh fish is caught locally to meet the ever increasing demand, it is clear that this Territory, which is surrounded by a huge ocean, lacks a fish industry, which, if enough developed, could mean a potential source of income for Western Samoa.

III FORESTRY IN WESTERN SAMOA 1960

32. There were no new developments during the year. Two sawmills continued to operate, one of these supplying timber in shooks equivalent to 48,000 banana cases.

An experimental burner was erected to assist disposal of sawdust to reduce breeding of rhinoceros beetles.

Proposals for development of forestry reserves and for aforestation on a progressive scale were made in the review report on economic development.

SECTION II

THE DEPARTMENT AND ITS WORK - 1960

ADMINISTRATIVE SERVICES

Staff:

Retirements& Resignations:

33. Two senior professional officers - the Entomologist, Mr P.S.Dale M.Sc., and the senior Agricultural officer Mr A. Higgins B.Sc.Ag. completed their tours of duty and left the Territory in January - the latter was not replaced during the year and the duties of the post were carried out by the Agricultural officer Development Mr G.W.Minto B.Sc.Ag. conjointly with his other activities. The Acting Administrative officer (Mr E. Williams) resumed his substantive duties at the Post Office on 13 May. The Chief Clerk Mr G.T. Tuiletufuga retired on 11th August after a long service in Government office. A tribute is paid to his long and meritorious service in the Department during most of that time.

A number of subordinate officers left for various reasons and at year's end there were 8 vacant posts.

New Appointments and Replacements:

34. Agricultural Officer as from 20th January 1960. Principal Avele Agricultural College as from 13th March 1960. Administration Officer as from 13th May 1960. Field Assistant (W.F.Meredith B.Ag.Sc. (Hort) as from 16th May 1960, Field Assistant (T. Leupolu Dip. Ag.) as from 16th May 1960. Senior Field Assistant (Construction) as from 1st October 1960. Senior Clerk Mrs E. Matthes as from 1st May 1960. Various vacancies in the subordinate staff groups were filled by local appointments.

Leave and Overseas Duty:

35. The Agricultural Officer Extension (Mr V.A.T.Leavasa) was selected for special training (Crash course) in New Zealand and was absent from January to August.

In October the Director attended Food and Agriculture Technical Meetings on Bananas and Coffee.

Laboratory Assistant Kesi Ale carried out special studies in Fiji during June and later was granted a U.S.I.E.E.A. scholarship in pest control work in Hawaii U.S.A.

Mr S. Lolesi, Field Assistant was granted an Australian Government Scholarship in Agriculture and left in February. Messrs Faleniu and J. Alama were selected as students at the Central Medical School in Fiji and left in January.

Pulefa'atoaga:

36. These newly appointed officers carried out useful work during the year. Quarterly meetings were held at which programmes were discussed and demonstrations given by senior staff. Several of these officers made valuable contributions by undertaking special work in banana packing supervision, control of rhinoceros beetle and banana virus disease and control of weeds. See also para. 105.

Information Services:

37. Although owing to congestion at the Government Press it was impossible to maintain fully the issues of the departmental circular "Laufasi Ola" - several numbers were published, including a very useful bulletin on the Pests of Samoa prepared by the Entomologists of Western and American Samoa. Many press releases and radio talks were made.

The reorganisation of the Library commenced in November and marks an important advance in improving the facilities for advisory and research work.

Draft legislation was studied in collaboration with the Attorney-General.

Field Days:

38. Attendance at field days and demonstrations increased very heavily and an agricultural show staged at Mulinu'u, illustrating the Department's work attracted many visitors.

Overseas Cooperation:

39. Assistance of mutual value was given to and received from many overseas visitors, some of whom were on special assignments. From the South Pacific Commission came the Fisheries Officer (Mr H. van Pel) the Acting Plant Introduction officer (Mr J. Parham) the former to investigate prospects for commercial fisheries development and the latter in the course of a Pacific wide investigation of improved breadfruit and coconut varieties.

Boards and Committees:

40. The Director was a member of the following: Land Use Board, Western Samoa Trust Estate Corporation Board of Directors, Economic Development Committee. As a delegate of the Governments of Western Samoa and New Zealand and an observer for the South Pacific Commission he attended two F.A.O. Technical meetings and continued as a member of the S.P.C. Research Council.

Special investigations:

41. Laboratory analyses of cocoa and copra continued; 73 samples being dealt with. Staff were trained in the necessary procedures and work was carried out for the public. Arrangements were made for the overseas training of a local officer. By courtesy of the Managing Director of Messrs Island Industries Ltd., Fiji (Mr W.G.Johnson) and the Director of Agriculture, Fiji (Mr J.M. Watson O.B.E.) it was possible to take advantage of an offer of travel assistance from the Secretary General South Pacific Commission and to finalize proposals for this undertaking.

Preliminary work on soil studies were initiated; and much time devoted to experimental processing of manila hemp, bananas, annatto and other minor cash crops.

Many enquiries regarding determinations of plant material were attended to.

Transport and Equipment Control:

42. A high standard of organisation, control and maintenance of vehicles and mechanised equipment was attained under the supervision of Mr Holterman ten Hove, whose report is as follows:

Transport:

43. Departmental transport control was taken over by the writer from the Entomologist in the beginning of the year.

Up till the 14th November, when all departmental transport, except the 4 vehicles in Savai'i, were taken over by the Public Works Department Transport Pool, the fleet consisted of 10 Land Rovers, 2 trucks and a Pick Up. One Land Rover, already written off and replaced, was taken over by the Public Works Department in June.

The Marketing Division's fleet consisted out of 3 Land Rovers of which one was laid up permanently and later sold to the Public Works Department. In August the Marketing Division purchased a Land Rover which has been stationed at Salelologa.

One vehicle of each of the Agriculture and Marketing Division fleet was already stationed in Asau and Salelologa respectively and in October an Agriculture vehicle was sent to Savai'i so that up till the present date Salelologa and Savai'i agricultural depots have each one Agriculture and one Marketing Division vehicle.

Although all the vehicles were used every day on rough roads and in all weather, a satisfactory standard of roadworthy vehicles could be maintained. From April onwards all Departmental vehicles were serviced and repaired at the Public Works Department and under the circumstances an efficient service was maintained by the Public Workd mechanical overseer.

Mechanised Equipment:

44. Owing to the increasing amount of mechanised equipment used by this Department, it was necessary to employ a mechanic full time. The following equipment has to be regular maintained:

2 Ferguson tractors and implements	2 Swingfog machines
23 Micronette sprayers	1 Solo sprayer
3 Rega sprayers	1 Tractor drawn sprayer
	1 Waterpump.

Of all the equipment, the Micronettes, most of which have now been used daily for 7 months on end need much servicing for the task assigned to them. In the first place, trained operators for these sprayers are not always favourably trained and many changes of operators are necessary.

Secondly, the terrain where these sprayers are used is rough and difficult for these light machines.

AVELE AGRICULTURAL COLLEGE AND SCHOOL

45. The year 1960 was marked by two important events at Avele viz. the closing at the end of year of the primary department and the graduation of the first agricultural students from the College. The school year began on February 1st. A considerable amount of damage was done during the storm in January, but no sign remained by the end of the first term.

Staff:

46. Mr I.L. Milne acted as Master-in-Charge until the arrival of the Principal on March 21st. The staff composed the Principal (Mr E.L. Hardy B.Ag.Sc.) - two assistant masters; four Teachers and two cooks.

One teacher Mr Aleni Williams resigned at the end of the first term to resume his old position in the Legislative Department, but continued to conduct the Sunday morning service.

Mr D.L. Jones left on furlough on December 10th.

Roll:

47. The total roll was 132 students, made up as follows:

	Form II	Form III	Form IV	Form V	Total
From Cook Islands		6	6	7	19
Niue		2	2	2	6
American Samoa			2		2
Western Samoa	34	27	23	21	105
	34	35	33	30	132

Programme and Syllabus:

48. The syllabus conformed to the original plan for the College. The timetable analysis is set out below. The Director and the Agricultural Officers of the Department assisted in the teaching of Agriculture, and in the organisation and supervision of practical work, throughout the year. Officers from the Lands & Survey Department, and Mr Franklin, of Fruit Distributors Ltd., also gave lectures during the last term.

The timetable Analysis was as follows:

Subject	Form III	Form IV	Form V
English	10	10	4
Social Studies	5	2	2
Core Mathematics	5	4	5
Manual	4		4
General Science	6	3	-
General Agriculture	4	6	10
Field Husbandry	-	3	1
Animal Husbandry	-	4	4
Forestry & Fisheries	-	2	2
Entomology	-	-	2
Music	1	1	1
	35	35	35

The Student Day:

49. The students have a busy day, starting at 6 a.m. until they retire after 'lights out' at 9 p.m. In outline the average day consists of -

1 Compound work $\frac{3}{4}$ hour
2 School work 5 hours
3 Farm work 2 hours
4 Supervised homework $1\frac{1}{2}$ hours.

One afternoon is free each week for sport.

School Buildings:

50. Two Samoan teachers' houses were constructed in permanent materials. Three dormitories were built and a fourth and final one was almost ready for occupation at the year's end.

Student Field Projects:

51. Demonstrations were arranged from time to time on plantations and on the Department's Stations. In addition the students did practical work on the College Farm, the Forestry areas, at Nafanua and with the Extension services.

Examination Results:

52. The end of year examinations were of particular importance this year, for they marked the final examinations for a primary class, and the first final examinations for Form five. Sixteen pupils in Form 2 obtained a complete pass and all the others a partial pass. The Form 5 class began in 1958 with 35 students, and of these 30 completed the course. 24 students satisfied the pass requirements, and were awarded the Avele College Certificate of Agriculture and Animal Husbandry. The others were provided with a testimonial.

Prize Giving Ceremony:

53. The ceremony was held on December 15th. An address was given by the High Commissioner; and Mrs Wright presented the prizes.

Health:

54. The health of the students was satisfactory throughout the year. After visits by the dentists, they reported on the good condition of the students' teeth. A nurse attended weekly. The whole school was tested for filaria, and the necessary treatment carried out. A check on eyesight revealed that only two students require further examination.

Sport:

55. In the 1st term six teams were entered in the schools football competition. The 1st fifteen won the senior grade competition for the second year in succession. In the 2nd term the College won both the Schools' trophies in Samoan cricket. During the 3rd term there are no inter-school sports activities, except for the annual sports day, at which the Avele students collected a fair share of prizes. Facilities for table tennis and volley ball are also available.

Overseas Visitors:

56. Amongst the many visitors were the following from overseas:

Mr L. Pitt, Official Secretary, Cook Islands Administration
Mr Van Westendorp, Agricultural Officer, Niue
Members of the Maori Football team.
R.N.Z.A.F. group from Fiji.
Mr A.N. Leslie, General Manager, U.S.S.Co.
Mr V.D. Stace, South Pacific Commission
Mr H. van Pel, " " "
Mr M.J. Senter, Director of Education, American Samoa
The Governor of American Samoa.

Many other visitors, particularly from the Cook Islands, called at the College while passing through Samoa.

JERSEY COWS AT AVELE FARM

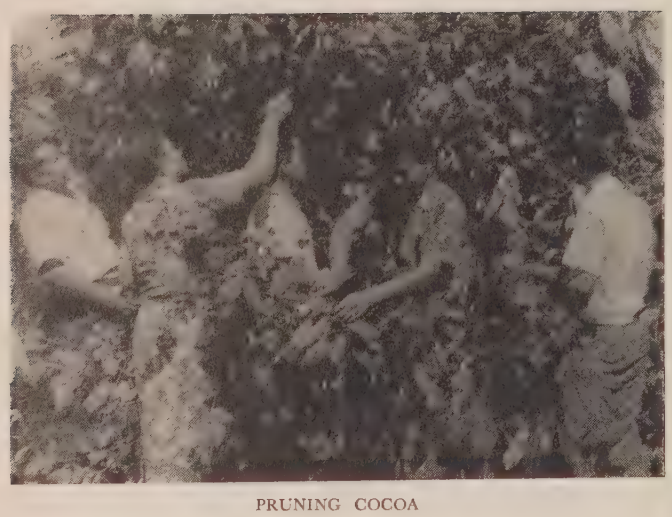
O TUAIGA POVI FOU LENA I LE FA'ATOAGA I AVELE E TAU'A O LE JERSEY.

STUDENTS MILKING AT AVELE FARM

TAMA TAU SUSU I LE FA'ATOAGA I AVELE

ANIMAL HUSBANDRY CLASS

VASEGA O MEA TAU LAFU MANU



PRUNING COCOA

TEUGA O KOKO

LABORATORY CLASS

VASEGA O SU'ESU'EGA O VAILAAU MA TOGAFITIGA

AVELE AGRICULTURAL COLLEGE STUDENTS AT WORK

TAMA A'OGA O AVELE O LO'O GALULUE

AVELE AGRICULTURAL COLLEGE FARM

Land Development:

57. The report of the Agricultural Officer Development (Mr G.W.Minto) is as follows:

The development of the Farm continued under the supervision of the Farm Manager (Mr H. Treviranus) working with Agricultural Officer Development. The farm comprises: Home farm - 80 acres, Vailima fields 30 acres, Vaea fields 150 acres, Alaoa 20 acres. A new area of 12 acres was cleared and fenced, and a further area of 5 acres was cleared and planted with taro. The grazing areas were improved by further planting with superior grasses and legumes, particularly Batiki blue grass and Centrosema.

Livestock:

58. In March two locally bred sows were purchased. In late August 160 Rhode Island Red day-old chicks were obtained from Fiji.

At the end of August a pedigree Hereford young bull was purchased locally. The livestock on the farm at the end of the year was as follows:

Dairy herd 51; Beef herd 103; Pigs 9; Poultry 99; Horses 10.

Crops:

59. A variety of crops was grown to provide student rations and stock feed.

Root crops: Taro, ta'amu and manioca.
Vegetables: Sweet corn, beans, tomatoes, Chinese cabbage, choko, cauliflower, carrots, pumpkins, sugar cane, pele, kohlrabi.

Fruit: Pawpaw, melons, pineapples, coconuts, bananas.

Farm Buildings:

60. The piggery was completed early in the year. It is an all-purpose unit consisting of separate pens for farrowing, for fattening and for weaners.

A poultry house was erected during the year, with capacity for approximately 80 laying birds.

A barn and farm office were completed towards the end of the year.

Roads and Water Supply:

61. Existing farm roads were widened and improved. A pump was installed at the reservoir previously constructed, further pipe lines were laid, and a water supply was thus brought to several extra paddocks.

Farm Production:

62. The principal animal and agricultural production was as follows:-

Milk	9,784 gallons	Bananas	10,387 lbs
Taro	39,372 lbs	Pineapples	193 "
Breadfruit	32,891 "	Fresh Meat	2,280 "
Vegetables	5,012 "	Cassava	4,378 "

Five Rhode Island Red roosters were sold to the public.

Student Field Activities:

63. Throughout the year practical instruction was arranged on the farm for the Avele students. Three afternoons a week were normally devoted to practical work, which was under the general supervision of senior officers of the Agriculture Department. Specific demonstrations for example in livestock husbandry, weed control and processing of cocoa, coffee and copra were also held from time to time.

Many visitors, local and overseas, were shown around the farm during the year.

Overseas Training:

64. Two scholarship students completed overseas agricultural courses and returned to the Territory to take up their duties with the Department. They are:

Mr W.F. Meredith B.Ag.Sc.
Mr T.K. Leupolu Dip. Ag. Massey Agricultural College.

Two scholarship students continued their studies at Massey Agricultural College with somewhat disappointing results.

An Agricultural Officer, Mr V.A.T.Leavasa was in New Zealand for six months in an In-Service Training Crash Course. A Laboratory Assistant, Mr K. Ale was awarded a six months scholarship under the United States International Educational Extension Agency for study of pest control in the U.S.Department of Agriculture and University of Hawaii. A Field Assistant, Mr Lolesi Sa'olotoga was awarded a Government of Australia Scholarship and commenced studies for an agricultural diploma.

Staff Training (Local)

65. In spite of major preoccupation of the reduced Senior staff with routine duties and teaching work at Avele Agricultural College the progressive training of junior staff continued with promising results. Opportunities for promotion to positions of greater responsibility proved a useful incentive to several officers who made good progress with their knowledge of the technical aspects of their work.

AGRICULTURAL STATIONS AND RESEARCH

66. The land available to the Department for experimental and demonstration work and for propagation and distribution of improved crop plants is still inadequate. There has been a great increase in public interest in the work being done, in the number of visitors, and in the demand for information, seeds and plants. Brief notes are given on the work carried out during 1960 at the four localities.

NAFANUA-VAILIMA-LAFI

67. The main activities in the programme for these areas has been recorded in the previous years report. These were fully maintained and expanded during 1960 with special attention to work on bananas, cocoa, coffee, manila hemp, pasture plants, minor export crops, bamboos and vegetables. Brief notes on progress with the more important projects is given below.

Bananas and Manila Hemp:

68. The banana plot at Nafanua was maintained for demonstration on the effect of fertilizers and the control of pests and diseases following the programme described in last year's report (para. 103) Careful records of this work are kept. The number of cases

packed for export indicates an average yield of 250 cases per acre from fertilized plants. Further consignment of dried (reject) bananas was sent to New Zealand for experimental work.

69. Manila hemp plots were extended and the construction of a manually operated hagotan enabled samples of fibre to be prepared. The quantity of stems available from departmental areas proved too great for processing in this way and a suitable power operated machine is being sought. The general appearance and quality of the fibre appears to be very good. Certain growers requested plants. These were issued on the clear understanding that the Department, at this stage, cannot guarantee any market for the fibre.

Cocoa:

70. The propagation of high yielding clonal cocoa continues and the nursery area was gradually enlarged with some 225 plants of ten new clones planted out. The distribution of seeds and cuttings was:

Seeds 7,000; Seedlings 34,800; Rooted cuttings 1,930.

From Borneo was received a consignment of seeds of a selected forastero-amelonado type recommended by Mr D.H. Urquhart of Messrs Cadbury Bros., Ltd. Seedlings were raised and planted out at Nafanua.

Fertilizer and pest and disease control treatments were carried out in all plots at Vailima, Lafi, Nafanua and Togitogiga. Very large increases in yield were recorded and all pods not required for seed purposes were processed at Nafanua.

	Pods	Dry Cocoa Beans (lb)	Remarks
From Vailima	9,666	908	Mixed clones and seedlings 10.6 pods to 1 lb dry cocoa.
From Nafanua	11,143	1,226	do.
From Lafi	23,166	2,110	Lafi 7
From Falealili	290	25	Kerevat seedlings

A total of 4,269 pounds of dry cocoa of good quality was produced and most of this was sold to Messrs Cadbury, Fry Pascall Pty., Ltd., of Hobart who have provided very valuable reports on all consignments. Proceeds from these sales totalled £281 during the year and a balance of £243 was due for 27 cwt cocoa beans produced but shipped after the end of the year.

Coffee:

71. The second harvest from 335 Arabian coffee trees at Nafanua provided an opportunity for a study of production yields, processing methods and grading.

Staff and students participated in cultural practices of pruning, fertilizing, mulching, harvesting and processing.

A sample of Arabian coffee sent to New Zealand was as follows:

"The bean roasts very well, but has a fair amount of silver skin and centre-cut. It liquors out very well having a good colour and medium gut, and fair acidity with no trace of objectionable flavours. The A.B. & C. grades have very good commercial prospects if more

silver skin could be removed and the bean perhaps sun dried a little more. It is most encouraging to note that such good quality Coffee can be produced experimentally already and feel sure that with further experimentation, an excellent bean can be produced."

72. Other species and varieties of Coffee now in bearing at Nafanua are:

Arabian	C. arabica cf. BARBUK SUDAN
Excelsa	C. abeokutae
Robusta	C. canephora
Liberian	C. liberica
Bengal	C. bengalensis

Altogether 3,700 seedlings and large quantities of seeds were distributed to local growers and to overseas stations.

Vegetables:

73. For purposes of trial shipments small areas of the bell pepper (Capsicum) and eggplant were maintained. Altogether 46 cases of the former and 107 cases of the latter were shipped. The January storm and heavy rain caused much damage to the vegetable plots.

Other crops grown for local sale were: Sweet corn (U.S.D.A.) Long beans (Vigna), sword bean (Canavalia), Spinach (Basella), Pele (Hibiscus), Cauliflower (Puakea) and Tomatoes.

Seeds and seedlings were issued to growers and useful information obtained on the cultivation of these crops under local conditions and also on the market prices throughout the year. There is no doubt that local supplies of fresh vegetables could be greatly increased if growers could be encouraged to use better varieties and methods.

Pasture and Fodder Plants:

74. The grass and legume plots continued to provide seed and plants for distribution. For development of pasture areas, mainly in Upolu, all plots were grazed periodically. The species grown include -

Grasses:

Batiki Blue Grass	(Ischaemum)	:	Pennisetum ciliare
Falefa grass	(do var.)	:	Bothriochloa intermedia
Summer grass	(Paspalum)	:	Ixophorus linisetus
Java grass	(Polytrias)	:	Ischaemum timorense
Rhode grass	(Chloris)	:	U'u (Eulalia)
Angleton grass	(Dichanthium)	:	Paspalum scrobiculatum
Guatemala grass		:	Brachiara brizantha

Guatemala grass which is a very valuable addition to the fodder grasses in W.Samoa is well established at Nafanua and Avele.

Legumes:

75. The following useful species have been established and considerable quantities of seed distributed:

Flemingia congesta	:	Desmodium gyroides
Indigofera teysmanii	:	Sesbania grandiflora
Centrosema pubescens	:	Vigna sinensis vars Barsati
Desmodium unciniatum	:	Pueraria phaseoloides
Pueraria javanica	:	Phaseolus adenanthera

Plant Introductions:

76. During the year 206 parcels of seeds plants and cuttings were introduced from overseas or collected locally for propagation, observation and distribution to the public. The list of these introductions may not be compiled before the Annual Report is issued and the following summary is therefore provided. This indicates the more important items handled during the year.

Breadfruit (ULU)	Artocarpus altilis	- 96 varieties
From Tahiti (22)	Dept. of Agriculture and South Pacific Commission Plant Introduction Officer.	
From Aitutaki (5)	Resident Commissioner.	
From Netherlands New Guinea (10)	S.P.C. Assistant Plant Introduction Officer.	
From Tonga (18)	S.P.C. Plant Introduction Officer.	
From Rotuma (13)	do.	
W.Samoa (Upolu & Savai'i) (27)	Departmental staff.	
From Ivory Coast (1)	do.	

PAPER MULBERRY (U'A) - Brousonnetia papyrifera
From various local sources collected by Departmental staff and Pulefa'atoaga - 5 parcels of 217 plants.

VANILLA - Vanilla fragrans - from Tahiti - 5 varieties.

BAMBOOS - Bambusa, Melocanna
From Puerto Rico - U.S. Department of Agriculture and from American Samoa Department of Agriculture - 7 parcels and from local sources one parcel.

PASTURE & FODDER PLANTS From Fiji, Ivory Coast and local sources - 13 parcels of seeds and plants of grasses and legumes.

VEGETABLES - 9

FRUITS & NUTS - 13 including first introductions of Pistachio nut, Pachira edulis.

COCOA - An important introduction from North Borneo of Forastero - amelonado seeds.

BANANAS - one introduction of Poyo banana from Ivory Coast.

Forest Trees:

Other plants of interest include a West African strain of Bixa orellana (LOA) with large conspicuous fruits: Macadamia or Queensland nut: Justicia - a food plant for the Scolia wasp parasite of rhinoceros beetle, and plants of potential economic value as Evodia and Scaevola.

The details of introductions is at Appendix 9.

In addition to the greatly increased distribution to local planters and residents of plants from departmental nurseries - there has been a very considerable distribution to overseas institutions. These activities are recorded elsewhere in the report.

Domestic Crops:

77. Small plantings were made of pineapples (2 varieties) for studies on fertilizers and controlled fruiting. A few cases were shipped for observation on storage behaviour.

Other minor crop plants grown were - Arrowroot, edible canna, ginger, cassava, ta'amu (2 vars.) dasheen (5 vars.), Taro, pigeon pea, black pepper, rice and vanilla. Trial shipments of pawpaws (Esi) both Solo and local varieties were continued; 444 cases being shipped during the year (= 12,563 pounds).

Fish Culture:

78 The breeding pond continued to supply Tilapia fingerlings for the stocking of various fresh-water ponds and also some bait for marine fishing trials.

Forestry:

79. All forest trees at Nafanua have made excellent growth especially poumuli, yemane, and malili. Several new bamboos were received from United States and from the Director of Agriculture, American Samoa.

Visitors:

80. At Nafanua there were 625 visitors recorded during the year.

Revenue:

81. The total revenue from sales of seeds, plants and produce from Nafanua was £1,072 as follows:

Annatto (Loa)	£12.13.10.
Bananas shipped at 10/- each	96.19. 0.
Capsicum (Polo), Eggplants (Isala'elu) and Pawpaws (Esi) exported	396.19. 3.
Cocoa Beans exported 207.4.10. " " exported after 31 December 243.0. 0.	450. 4.10.
Cocoa seeds, seedlings & Cuttings	73.16. 0.
Copra drying charges	10.10. 0.
Miscellaneous: Firewood, Pineapples and general produce	31. 8. 9.
	£1,072.11. 8.

FALEALILI AGRICULTURAL STATION

82. One Field Assistant assisted in the supervision of this Station under the control of the Agricultural Officer Development. Pending a policy decision on the development of this station the programme was restricted to an essential minimum.

General Maintenance: Areas of bananas, cocoa, Manila hemp, coconuts and pineapples were maintained. The coconut area came under heavy attack by the Rhinoceros beetle, and the frequency of crown treatment was increased to once every four weeks. This action had a good effect on the condition of the palms.

Planting: In the early part of the year 590 Lafi 7 cocoa seedlings were planted in the banana area. Towards the end of the year new land was cleared and 600 Lafi 7 seedlings were planted.

Produce and Plants:

83. Bananas 155 cases, Cocoa 662 pods, Pineapples 67. Total revenue was £97. 2,510 Manila hemp suckers were distributed for village planting. Niuvao, bamboo and treefern were supplied from time to time for use on Departmental Stations, or in Departmental projects. Ifiifi seed was collected for use at Vailima.

FIELD ADVISORY SERVICES

Staff:

84. With the departure in January of the Senior Agricultural officer and the absence for six months of an Agricultural officer on study leave - the Field extension and advisory services were carried on under considerable difficulties.

The Agricultural Officer Headquarters (Mr P.B.Newell B.Ag.Sc.) was responsible for all the field service and also for supervision of the Banana allocations and marketing activities.

The Agricultural Officer Extension returned to duty in September and as Agricultural Officer Export Crops was responsible for banana shipping activities and for organised field work with alternate cash crops his report is at paras 98 to 107.

Programme:

85. The programme as described in the report for last year was generally adhered to but greater emphasis was necessary on the following major problems:

a) control of banana diseases;

b) distribution of fertilizers to banana growers;

c) plantation surveys necessary to ensure rapid return to full production following the storms in January;

d) plantation services - pruning and spraying cocoa - and weed control;

e) inspection of cocoa and copra driers;

f) from October on a concentrated campaign to extend plantings of new crops to replace bananas eradicated under the virus disease control programme (see paras 98 - 107.

Bananas:

86. Good progress was made with field projects aiming to improve banana production.

a) continuance of pilot Leaf-spot disease control programme;

b) erection of wharf shelter at Fagamalo thus completing shelters at all ports in Savai'i;

c) Accelerated distribution of fertiliser to growers.

Banana Diseases:

87. Bunchytop virus disease control was continued throughout 1960 but a good deal remains to be done. Assistance to growers in the form of teams of men to eradicate all existing diseased plants, was given in an area of approximately 30,000 acres in Safata, Lefaga, Tanumalala, Leulumoega, South West Coast, Lepale and Aleisa and the incidence of infection has been markedly reduced in these areas, although failure on the part of many growers to maintain the standard by eradicating regrowths as they appeared has nullified the efforts of the Department of Agriculture teams. The work done in 1960 cost approximately £4,500.

A concerted effort by every banana grower will be required if this disease is to be controlled.

Leaf Spot Disease Control:

88. In June of 1960 a start was made on control of Leaf-spot disease the selected area being in Lepale and later extending through to Aleisa. An area of 725 acres of bananas is included in the trial areas and a marked improvement in the health of the plants within the area. Cost of the work for the period of operation was approximately £2,900.

This project was supervised in the field by the Senior Field Assistant Mr W. Meredith, whose report is as follows:

Banana plantations in the area have been regularly sprayed at monthly intervals with Shell 'Misting' oil using Micronette sprayers. The area under treatment is divided into three cycles. The original cycle I of 208 acres has had 7 applications; cycle II of 372 acres has had 5 and cycle III of 146 acres has received 3 applications. This brings the total acreage actually sprayed up to 3,748.

Bunchytop virus disease control is carried out in conjunction with leaf spot control when the weather is unsuitable for spraying.

Good results are visible usually after two applications in the form of healthy green leaves free from premature yellowing and spots. The advanced symptoms of leaf spot disease, when all the leaves are dead before the bunches are matured, is rarely to be seen in the treated area. Full benefit, however, of the 'misting' oil will be seen in the first months of 1961 at the time when the production of good quality bananas at Lepale is usually low. Further enhancement of the control of leaf spot has resulted from the use of fertilizers.

COCONUT RHINOCEROS BEETLE

89. The organization and supervision of field activities aiming at the control of the beetle by destruction of breeding places and by searching for larvae were the responsibility of the Agricultural Officer Mr P.B.Newell.

Field Campaign:

90.

Properties visited		10,080
Beetles destroyed		537,700
Breeding Places destroyed:		
1) Composts	3,389	
2) C/Logs	47,656	
3) C/Stumps	31,531	
4) Standing C/Trees	5,123 =	87,699
Warning Notices		4,819
Prosecutions		360

BANANA LEAF-SPOT DISEASE CONTROL – SPRAYING WITH *MICRONETTE*

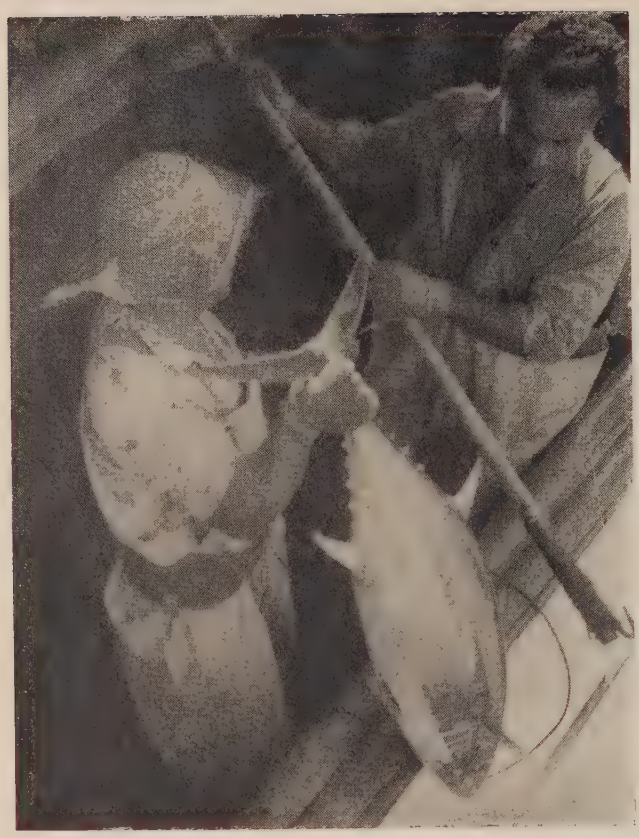
TOGAFITIGA O LE LAU-PULEPULE I LE FANAINA I LE "MICRONETTE" LE VAILAAU E TINEI A'I MEAOLA NINI'I.

BANANA VIRUS DISEASE CONTROL – INJECTING WEED-KILLER TO DESTROY DISEASED PLANT.

TOGAFITIGA O LE ANUFE O LE LAU-FETI'ITI'I, TUIGA O LE VAILAAU E TINEI A'I VAO LEAGA INA IA FAAUMATIA AI FA'I UA LAVEA I LE FAAMA'I.

CONTROL OF BANANA DISEASES 1960

TOGAFITIGA O FAAMA'I O LE FA'I 1960



LANDING A TUNA.

SISIINA A'E O LE TAGI I LUGA O LE VA'A

PART OF LONG-LINE CATCH

SE VAEGA O I'A NA MAUA I LE 'AFA'AFA LOLOA

FISHING TRIAL, A. K. "TRADEWINDS—*Photos by courtesy of Captain Athol Rusden.*

FAATA'ITA'IGA O FAIVA—A. K. "TRADEWINDS"—*Ata na pu'eina e le alii o Capt. Ethol Rusden.*

District Work:

91 The following areas have been covered by searching teams during the year.

1)	Town Area	-	Moata'a to Lepea throughout the year.
2)	Aiga-ile-Tai	-	Sstapuala to Falealili - January to May.
3)	Safata	-	June to July
4)	Aleipata and S.E.Coast	-	January to September
5)	West Coast	-	Magia to Apia - January to July.
6)	East Coast	-	Falevao to Fagali'i - August to November.
7)	Fagaloa	-	September to October
8)	Falealili	-	November
9)	Lefaga	-	August to September
10)	Savai'i	-	Sili to Iva - January to November
11)	Fagamalo	-	Samalaeulu to Aopo - January to November
12)	W.Savai'i	-	Asau to Taga - January to November.

92. During the period much less time has been spent in districts on actual searching for beetles and more important the actual destruction of possible breeding places. While placed on visible results are difficult to assess over a short period, there is a noticeable improvement in Aleipata district, but much more obvious is the great improvement in ground clearance which must arrest later possible damage.

The Pulefa'atoaga Saumalu of Aleipata has been of great help in this work and takes a keen interest in this aspect of his duties.

With the more rapid movement of gangs, made possible by a change of emphasis from beetle searching to breeding place searching a much greater area has now been covered.

During the year a gang has for some period covered all the territory from Tiavea to Falelatai and from Lefaga to Falealili.

In Savai'i a complete circuit of the Island is covered but with only 3 gangs and lack of transport - the cover is not as intense as desirable. Two more gangs are required - one to handle Fagamalo area and the other the Sala'ilua area.

93. The progress of chemical and Biological control work is described at paras. 115-119 below.

Weed Control:

94. The following paragraphs summarize the report of the Agricultural Officer Headquarters. The spread of noxious weeds continued to give cause for concern and Departmental activities were continued under the supervision of the Agricultural Officer Headquarters (Mr P.B.Newell) - with particular attention to Vao maligi (Elephantopus) Honolulu rose (Clerodendron) and Vao fefe (Mimosa invisa).

95. In the course of this year's work inspectors visited 2071 properties, issued 111 written warning notices and brought 4 prosecutions under the Noxious Weeds Ordinance.

96. Trials and demonstrations were carried out on 66 properties where a total of 29 acres of noxious weeds were sprayed. Many occupiers of land keep clear of prosecution by cutting down the weeds when instructed but there is actually a limited interest in the use of the more effective chemical control unless this is done free of cost by Government. A few planters have sought assistance with the control of general and noxious weeds in banana, cocoa and

coffee plantations and have undertaken their own work on Honolulu rose which was effectively killed by 2.4-D properly used.

Vao maligi continues to spread along roadsides, in village malae and lawns, in plantations and grazing areas. Its effective control has been demonstrated; but although it is potentially one of the worst weeds in the Territory, the public has not supported the Department's efforts.

97. Experimental work with chemicals including trials on the giant sedge referred to in the previous annual report, were continued as time permitted and the Department benefitted from the interests of several manufacturing firms who supplied chemicals for trial purposes.

Work on the biological control of vao maligi is described at para 121. Noxious weeds on Government property ($8\frac{1}{2}$ acres) were sprayed.

Sales of weedkillers to the public totalled approximately £400.

Export Crop Development Services:

98. The following report of the Agricultural Officer Export Crops describes the development work with new cash and export crops carried out in districts during the last quarter of the year i.e. September to December when he returned from New Zealand.

New Crops:

99. The policy was to hold meetings with growers regarding the planting of the new crops such as Cocoa Seedlings Lafi 7, Coffee, Manila hemp, Poumuli, U'a (Paper mulberry), Loa (Annatto) Tapa'a (Tobacco) Apu Initia (Cashew), citrus and coconut. In these meetings growers were reminded of previous advice given in 1957 to Pulefa'atoaga regarding the urgent need to diversify the production of export crops.

The rapidly increasing population must be fed and if the land is not developed to produce enough food then more money is needed to buy food from overseas. It is believed that there is still new land available for cultivation, but it is most important that the land and the soil (both new and old) be used in the best possible way to ensure that it is not denuded of its fertility and rendered incapable of sustained production. The grower must never forget that in his lifetime he holds the land in trust for his children and for future generation of Samoans and that while enjoying the fruits of his labour, must try and leave the soil better, and not less fertile, than he found it.

Village Plantings:

100. After a considerable time spent in these meetings fortunately we received a good response from the following villages: Salamumu, Si'umu, Lepā, Lauli'i, Vaiala, Fogātuli, Moata'a and a large number of individual growers applied for planting materials.

The following list records a small number of growers who have received such planting materials but a large number of applicants who have not yet been reached by our small staff is not shown in this report.

In Savai'i, however the work was a little different in the beginning although most of the planters have shown their interest, but a few were still blindly doubtful, for they thought that their properties would at sometime be taken over by the Government.

Fogātuli:

101. This particular village of Salega district requested the department and offered their land to be used by the Department as a demonstrated portion for their district. The request was lodged by the Salega Pulefa'atoaga. All necessary action was taken and the planting materials were supplied and planted under the proper supervision of the divisional officers.

Banana Rehabilitation:

102. Field work to promote the replacement of bananas on the old bunchy top area in Lefaga and Safata was commenced. In Lefaga few growers started to plant with banana suckers selected from other clean areas. The Pulefa'atoaga was informed to let us know, where and when they prepare to lift some materials offered to them by any village, we could then send our men out to inspect the materials and a truck to pick them up and to transport them to Lefaga. That is the only help we could provide but to date no applications have been received for this assistance.

Roads and Wharves:

103. Two officers of this section have been concentrated to that effect one in Upolu and one in Savai'i to meet a large number of applications lodged for access roads to be constructed. Reports have now been prepared for further action by the Public Works Department.

The conditions of Asau wharf is still the same as it was in 1959. A small extension was added and left uncompleted. A meeting with this authority may encourage them to finish. Sala'ilua wharf - good when it is high tide but berth needsdredging. Fagamalo wharf is in good order. Salelologa wharf - shed needs painting.

Overseas Research:

104. Mr J.W. Parham B.Sc., of the South Pacific Commission toured in Savai'i, Manono and Upolu with staff of the section on Breadfruit Research work.

Pulefa'atoaga:

105. The Pulefa'atoaga have been carefully controlled and their programme of work handed to each one of them to be followed. A constant check from the section officers almost every week makes things easier and more understandable but a shortage of staff exists. The detailed inspection of 1960 plantings will be commenced in February and March 1961. Results will be forwarded for the next Pulefa'atoaga meeting in April 1961. One of them was away in New Zealand and Field Assistant Amituana'i kept his eye on this district. Absences of from one to two weeks due to illness were recorded.

District Banana Supervisors:

106. These men always received criticism from the growers for they are the ones who are much closer to the growers and who understand better each grower's attitude. Good reports have come from these men which are very helpful to the senior allocation officers and all staff. Supervision of the handling of fruits, slowness of packing and carting, packing sheds are the main duties of these men. The staff of this section also helped and assisted the Produce Inspectors in Copra and Cocoa inspection in country districts and in Apia stores.

Publicity:

107. Several talks prepared and broadcasts over the air in connection with planting of cash crops food crops and quality of copra, cocoa and bananas.

Details of planting materials (poumuli 2,000, cocoa 6,429, Coffee 6,691, Manila hemp 2,048 and 2,000 coconuts) supplied to the villages and other individual growers are listed at Appendix 8.

BANANA MARKETING

Staff:

108. There were many changes of accounting staff during the year. For nine months the general supervision was in the hands of the Agricultural Officer Headquarters with a Senior Shipping officer handling the distribution transport and shipping work and a Senior Accountant responsible for financial work. For the last three months the work was reorganised, especially to enable more effective attention to be given to the investigation and promotion of additional export crops. An Agricultural Officer (Mr V.A.T.Leavasa) was posted to organise and supervise not only banana shipments but also to develop other lines - the accounting services were further integrated as part of the Departmental administrative section. Additional shipping officers and Tally Clerks were posted to Savai'i centres to cope with the expansion of production in that Island.

Export of Bananas:

109. The number of cases shipped and paid for during each month is as follows:

January	51,142	July	41,608
February	48,093	August	53,618
March	38,821	September	50,980
April	33,513	October	75,289
May	39,081	November	67,298
June	34,124	December	69,984

Total = 603,551 cases

Accounting for these consignments and arranging prompt payment to growers was complicated by losses in transit due to vessel breaking down or stranding, or to lack of shipping space resulting in cases being left behind at Apia. Altogether nine shipments were so affected involving a total of 3,457 cases. In only one case was it necessary to with-hold payment from growers for 531 cases packed without authority and surplus to available shipping space.

Finance:

110. Extremely heavy staff work was necessary owing to the giving of production to Savai'i and to the need to extend financial and transport services to distant areas. The total shipped from Savai'i was 237,366 and from Upolu 370,453 cases. The additional costs of freight and transport due to changed circumstances adversely affected the margin available for Bonus payment to growers. Following Cabinet approval in December a bonus at the rate of 6d per case (£15,334) on all cases supplied during the period December 1959 to November 1960.

PUAKEA CAULIFLOWERS GROWN AT NAFANUA

ITUAIGA KAPISI (CAULIFLOWER) E IGOA O LE PUAKEA O LO'O TOTOINA I NAFANUA

The income earned from bananas exported during 1960 amounted to £694,082.12.6. of which the following significant payments were made besides the various other items of expenditure:

1.	Payment to Growers (including bonuses)	£307,332.17. 0.
2.	Payment to Export Duty	30,179. 6. 0.
3.	Inspection fee	10,055.15. 8.
4.	Payment to Contractors	73,761.17. 5.
5.	Payment to staff and Labours	33,874. 5. 8.
		£455,204. 1. 9.

New Developments:

111. Under approved estimates provision had been made and work was completed on the following projects:

a) office extension at Savalalo - Cashier and Allocations officers;

b) wharf shelter at Fagamalo in Savai'i;

c) Bulk store for fertilizers.

Other development activities involved the appropriation of funds to field activities of the Department in connection with the control of virus and leaf-spot diseases of bananas (para. 88) and with the distribution of fertilizers to banana growers.

As in previous years stocks of insecticide and applicators were held for sale to growers.

Transport Contracts:

112. The cartage of bananas was handled by contractors 5 for sea transport and 10 for land transport of bananas. In addition 14 subcontracts were approved to enable individual producers to transport their own fruit to shipping points. Contractors continued to give excellent service to the banana industry, often under difficult conditio There were occasions on which vessels brokedown and there were two strandings involving a loss of 1983 cases in all.

Other Activities:

113. Although during the past two years the Department has conducted trial shipments of various fruits and vegetables produced on experimental areas there has been an obvious need to assist and encourage local exporters. To this end a start was made with several consignments of pineapples, pawpaws and avocado.

As compared with previous years there was a marked increase in the quantity of such produce exported. See Appendix 5.

PEST CONTROL, PLANT QUARANTINE AND ENTOMOLOGY SERVICES

Staff:

114. The Entomologist left the Territory in January. A replacement did not arrive before the end of the year. The work of the section was carried on by two Laboratory Assistants, under the supervision of the Agricultural Officer Development (Mr G.W.Minto) in conjunction with his other duties. His report is as follows:

Rhinoceros Beetle Control:

115. Field control work was carried out under the supervision of the Agricultural Officer Headquarters in 1960. (See paras. 89-93). In collaboration with Messrs J. Curry & Sons a sawdust burner was erected at Sogi.

Crown Treatment:

116. The regular treatment of palms in the port area continued throughout the year. A certain proportion of the time of the crown treatment gang was spent in field sanitation work on the ground. In the course of these activities 26,652 beetles were destroyed in the year. The number of palms climbed in the year was 15,828.

The insecticide used in the crown treatment work was BHC, which was mixed with sawdust. This method of treatment has now been used for a number of years, and has proved very effective.

Interest in the crown treatment work was shown by several planters and demonstrations were carried out at Palauli, Mulifanua and Fasito'outa.

Scolia Breeding:

117. A small area at the Prison Farm, Tafa'igata was maintained as a centre for breeding the parasitic wasp, Scolia ruficornis. Boxes of various sizes were placed there and filled with sawdust, and Rhinoceros beetle larvae were from time to time placed in the boxes. Justicia plants, which are known to be attractive to Scolia, were planted around the area. The aim is to collect pupae from this area for distribution to other districts.

Predator:

118. A predator on Rhinoceros beetle larvae, Neochryopus savagei, was introduced into Samoa during the year. Approximately 1,000, which had been collected under the auspices of the South Pacific Commission, were released at various points in Upolu, stretching from Leauva'a to Solosolo, and also at Samatau.

The predatory beetle is very powerful in attacking its prey and although it does not limit its activities to the larvae of Oryctes it is hoped that it will have a good effect in controlling the pest, should it successfully establish itself in Samoa.

Tests with Insectocutor:

119. An instrument known as an insectocutor was obtained early in the year. It consists of an electrified panel to which insects are attracted by means of ultra violet lights. The insects are killed, or in the case of larger insects, stunned, when they touch the panel. It proved very effective in attracting and killing a wide range of night-flying insects. A certain number of Rhinoceros beetles came to the light, but it is uncertain whether the instrument has a significant effect in attracting them. The apparatus was tried out in a number of different localities, with similar results in each. Throughout most of the year it was in operation at Nafanua Agricultural Station, and records were kept of the insects caught, with particular reference to the Rhinoceros beetle. An average of 3 beetles was taken per night at Nafanua, males and females coming in about equal numbers.

While installed at Avele a test was carried out in which numbers of marked beetles were released at varying distances from the instrument. The result of this test was negative. Further trials

appear to be necessary before its possible value in the control of Oryctes can be assessed.

Banana Scab Moth Control:

120. In May a consignment was received from Fiji of pupae and mated females of the Chelonus wasp, which parasitises the scab moth. Subsequently breeding was carried out in the insectary at Nafanua, and many wasps were liberated at two banana plantations, one at Papauta and the other at Toamua.

Parasite on Elephantopus Weed:

121. Two consignments were received from Fiji of the seed fly, Tetraeuaresta. This insect is a parasite on the tobacco weed in Fiji, which is related to Elephantopus spicatus, and it is hoped that it will parasitise the latter also. The first consignment was unfortunately received at a time when no Elephantopus could be found in flower. The insects were released but it is very unlikely that they were able to survive. The second batch was received in October, and the insects were set free at Fasito'outa and at Alamagoto, in both of which areas considerable quantities of Elephantopus were in flower at the time.

Fumigation Services & Spraying of Sheds & Hides:

122. The two fumigators at Nafanua were in steady operation throughout the year. Insecticidal spraying of cocoa and copra sheds, and the inspection and treatment of hides for export, were routine tasks carried out on many occasions. The total revenue earned by these activities during the year was £277.

Information:

123. The Entomologist in American Samoa, Dr J. Herring, paid two visits to the Territory in an advisory capacity, mainly in connection with the insectocutor.

A New Zealand Entomologist, Mr Hoy, paid a short visit in September, to collect scale insects. Departmental transport and staff were placed at his disposal.

Broadcasts on developments in entomological work and on the fumigation services were given.

An exhibit was prepared for the Agricultural Show at Mulinu'u in June.

Laboratory Assistant Kesi Ale was in Fiji for four weeks in March to learn certain techniques in connection with Chelonus, Tetraeuaresta and Scolia. Later in the year he was awarded a scholarship to study modern pest control methods in the U.S.A., the course to take 6 months. He left the Territory in late August.

LIVESTOCK AND FISHERIES

Livestock:

124. The Agricultural Officer (Mr J. Holterman 'ten Hove) was responsible for livestock and fisheries services. His report is as follows:

During the year considerable effort has been made to promote animal husbandry activities in both Islands, Upolu and Savai'i. In total 72 meetings have been held in villages, 87 castration demonstrations have been given and on numerous occasions advice and assistance concerning livestock have been rendered to the people. In spite of these efforts very little response came forward due to the fact that the people are not yet aware of the great potentials in the livestock industry and therefore not interested in an increased livestock production.

Livestock Port Inspection:

125. In the beginning of the year, the port inspection for livestock in Apia, normally carried out by a produce inspectors, was taken over by the newly formed livestock section. The livestock port inspection at Faleolo was carried out by a member of the Entomology section till September, when a continuous changing of airline schedules made this work impossible. With the difficulties experienced, it would be advisable however, to station an inspector at Faleolo permanently, when the two airlines companies start operating again. Although animal quarantine regulations to the Animal Ordinance are to be enforced early in 1961, the necessary steps have been taken to prevent the introduction of diseased animals into W.Samoa and an accurate record has been kept for imports and exports of livestock. (See para.25)

Livestock - Avele Agricultural College:

126. A pure bred Hereford yearling bull has been purchased locally to replace an old Hereford bull of the beef herd. Besides a new poultry section also a piggery has been established which will be extended during next year.

The dairy herd has increased over the last two years and some of the highly graded Jersey claves will be sold to approved breeders.

Experiments of pasture improvements are carried out and so far the results are very promising.

Diseases of Livestock:

127. Although efforts have been made to control some of the large amount of livestock diseases present in W.Samoa, very little can be done at the time on account of the following reasons.

Firstly, the absence of a qualified veterinarian and the lack of facilities (e.g. quarantine station) makes it almost impossible to attack the disease problems sufficiently to make a reasonable impression.

Secondly, through lack of money amongst the people and their inability to care for their animals makes the eradication of the diseases a difficult and long lasting task.

Valuable assistance has often been obtained from an officer of the Health Department in the struggle against livestock diseases.

Fisheries Services:

128. (a) Inland: Twice during the year 46 natural and artificial fish ponds, stocked with Tilapia mossambica, have been inspected and 5 more natural fishponds have been established.

The inspections showed that the Tilapia stocked in rivers, which are subject to flooding, are usually all washed out.

Of all the natural fishponds, two of them, both in Savai'i, produce a tremendous quantity of fish from which the villages concerned profit considerably.

Nafanua's single breeding pond still provides enough Tilapia fingerlings to distribute throughout Samoa, but to benefit from this fast breeding fish an additional two ponds should be built.

129. (b) Marine: Up till July fisheries work has been delayed on account of the continuous postponement of a visit of Mr van Pel, the S.P.C. Fisheries Officer. The visit eventuated at the end of July and an intensive inspection tour over Upolu and Savai'i has been made. Investigations have been carried out for the suitability of introduction of Trochus niloticus. Also a deep-sea fishing trial has been held to investigate the different fishing methods. Through lack of the availability of suitable local boats other deep-sea fishing trials had to be cancelled.

130. Some of the following recommendations are mentioned in a report from the S.P.C. Fisheries Officer:

a) The necessity of Fisheries regulations
b) The expansion of fresh water fishponds
c) The expansion of deep-sea fishing
d) The introduction of Trochus nilotigus
e) The erection of a fishmarket.

131. The Department's fisheries section acquired deep-sea fishing gear i.e. 20 baskets of long line fishing gear, trolling and hand-line gear, which is used for demonstration purposes. During the last half year many fisheries meetings have been held in both islands to encourage the use of mechanised canoes and to increase local efforts to catch more fish. Also some trials have been carried out to investigate the use of long-line and hand-line gear with small craft, which as yet have not proved altogether successful.

Most sport fishermen in the Territory own small craft, which are mainly used for trolling and hand-line fishing. None are, however, suitable enough to carry out long-line fishing, which methods would give a greater return if sufficient baskets were carried.

PRODUCE & PLANT INSPECTION SERVICES

132. The report of the Senior Produce Inspector (Mr S.A.Ma'ilo) on the work done by the Produce Section during the period is as follows:

Inspectors were interchangeably stationed in the various Apia sheds as well as the outlying districts' stores, specially for cocoa and copra, but during banana shipments, 3 to 4 inspectors remained in Apia for patrolling around the sheds, others were sent to the individual districts for supervising the quality and packing of bananas and the rest were stationed in Savalalo Building for the final inspection of bananas for shipments.

Copra:

133. The 14,835 tons exported represents a decrease of 942¼ tons less 133 than 1959 figure caused by the majority of growers selling out locally their coconuts to the public for food consumption at a price of 1/- for 3-4 pieces.

Many growers considered that they earned more quickly in this way with less work than cutting and drying. It seems that only a better price for copra can draw back the attention of growers to cut all their copra for export. The quality was very much improved.

Cocoa:

134. 3,563 tons were exported during the period. 288½ tons less than the 1959 export figure. The decline can be attributed principally to the wet season which has increased the incidence of black pod was provided poor beans.

The fermentation of cocoa was well done by a majority of growers, but there still remain several growers who used the foolish methods of boiling cocoa beans in hot water or fermented in baskets for a very short period of about 20 - 24 hours. For this reason several growers were reported to the Court by Inspectors on a charge of offering for sale under-fermented beans.

Bananas:

135. 603,676 cases were exported, 160,143 cases less than the 1959 figure. The decrease in 1960 figure caused by the devastation of plantations by storms in the beginning of the year.

Secondly, there were more good cases rejected in Apia owing to mixed packing with faulty fruit and also ripes.

The Island of Savai'i exported 235,045 cases mainly in the latter half of the year, but the rest were all from Upolu.

136. The records of all produce inspected for export and imported during the year are given in Appendices 2 to 6. The licences issued for cocoa and copra trading and processing and the prosecutions handled by Inspectors are shown at Appendix 7.

FORESTRY SERVICES

137. Under the supervision of the Agricultural Officer Development (Mr G.W.Minto) two Field Assistants were employed on Forestry work, the second assuming duty on February 1st. The Forestry areas under the control of the Department are Alaoa, Vailima, Mount Vaea Reserve, Vailima river and Aleisa Reserve.

Vailima Forest Nursery:

138. The following species were introduced into the nursery during the year.

	Sesbania grandiflora
Tauanave	- *Cordia subcordata*
Cashew nut	- *Anacardium occidentale*
Ifilele	- *Instsia bijuga*
Malili	- *Terminalia richii*
	Cedrela odorata
	Cassia grandis
Flamboyante	- *Delonix regia*
Yemane	- *Gmelina arborea*
Talie	- *Terminalia catappa*
Ifi ifi	- *Parinarium glaberrimum*
Tamanu	- *Calophyllum samoense*
Sago palm	- *Metroxylon sp.*
Poumuli	- *Securinega samoana*
Asi	- *Syzygium inophylloides*

At the end of the year nursery stocks were as follows: Poumuli 1,590, malili 390; Cedrela 206; mahogany 13; flamboyante 28; ifilele 39; talie 6; tauanave 80; *Cassia grandis* 42; Cashew 770; and *Sesbania* 132.

Distribution:

139. Seedlings were distributed during the year in the following numbers: Poumuli 2,565; Cedrela 160; asi 28; mahogany 35; Sesbania 130; tauanave 20; and ifilele, flamboyante and Cassia grandis in small numbers.

Planting:

140. Forest plantings were made as follows:

a) Vailima: 167 tamanu, 121 niuvao, 52 sago palms, 177 tauanave, 41 poumuli, 190 ifiifi, 15 ifilele, 50 gasu, and 12 teak.

b) Vaea: 634 poumuli, 394 Cedrela, 120 indigo, 70 ifiifi, 79 flamboyante, 70 Sesbania, 49 soursop, 51 Cassia grandis, 55 niuvao, and 35 yemane.

c) Alaoa: 442 Albizzia, 286 poumuli, and 250 Cedrela.

Thinning & Utilization:

141. In the forest thinning operations 406 trees were removed from the mahogany block, and 132 trees from the Cedrela block. The resulting posts were used at Vailima, Nafanua or Avele Farm, or sold. During the storm in January a certain amount of damage was done in the Vailima Forestry Area, particularly to the Albizzia trees: 151 logs from these trees were sent for milling, and were cut into timber of various sizes, and into fruit case shooks. In addition posts were utilized at Avele Farm.

Cocoa and Bananas at Vailima:

142. Small areas of cocoa and bananas are maintained at the Vailima Forestry Area. The following quantities were issued from the Station.

Bananas: To end of July - 29 bunches. August to December 5,689 lbs cocoa. 12,880 ripe pods and 1,429 cuttings for propagation. (See para. 67.)

Cooperation with Avele Agricultural College & Farm:

143. A close liaison was maintained with the College and Farm. Cattle from Avele grazed regularly in the Forestry areas, the electric fence being used when necessary. An area of ta'amu, planted between the rows in the ifiifi block, was maintained by the students. Instruction in forestry was given to the students at Vailima, and part of their practical work was done there.

Visitors:

144. A number of visitors came to the Forestry areas during the year, including the Governor of American Samoa, the Director of Agriculture, American Samoa, the Agricultural Officer, Niue, and visiting scientists and agriculturists from New Zealand, the Cook Islands etc.

Information:

145. An exhibit was prepared by the Forestry Section for the Agricultural Show held at Mulinu'u in June. Quantities of bamboos and stakes were supplied from time to time to the Department's other stations, and firewood was supplied to the College, and sold.

CONCLUSION

146. In reviewing the last year's work, as has been attempted in the preceding pages, Departmental officers have, each in his own way, indicated the progress made with the day-to-day activities and problems of the agricultural and related industries on which the economy of the Territory depends.

The year has ended with some retrogression in overseas markets for the major products - cocoa and copra, and with insufficient shipping space or market demand in New Zealand for the available banana crop. As a result, the prospects for 1961, which is an important year in the Territory's history, have been variously assessed.

147. The year's copra crop was 2,500 tons below estimate and the Secretary Copra Board has stated - "No satisfactory explanation can be given for the decline." (2) He anticipated that world prices will likely settle at between £60-£65 c.i.f. per ton and has recommended a revision downward of local prices as soon as possible; with £22 per ton or 22/- per 100 pounds local price to producers as a fair level!" With production costs admittedly about £20 per ton, the major incentive of favourable prices thus appears to have almost disappeared. Fortunately, however, over the past four years there has been a great advance in the standard of drying, so that the bulk of the Copra exported is now of high quality, whether hot-air or sun dried. In the coming year, if replacement planting, as explained in last year's report (1 para. 43) is to keep pace with losses of palms, urgent consideration must be given to an active and progressive planting scheme; and possibly if the stabilization or Reserve Fund is to be drawn on, as suggested, some form of subsidy on planting could be operated.

148. The cocoa industry suffers from ignorance and neglect not only in the lack of planting and cultural management but also in the standards of processing, i.e. fermenting and drying. For some months there has been no demand for so called Samoan Grade 2 and this is not surprising in view of the low quality of many consignments. At the present time it would appear to be imperative that all concerned in the production and handling of cocoa for export should work together for a significant improvement in average quality of Samoan beans. The passing into law at an early date of legislation to improve the standards of export cocoa and to assist the control of pests and diseases would be an important factor. The estimated production for 1961 is 3,600 tons (4,000 m. tons) - it could be very much greater!

149. In the case of bananas, it is clear that growers have responded most effectively to the Government's appeals and that already very heavy surplus production has to be faced both in Upolu and in Savai'i. This surplus is now estimated to be 70,000 cases per month, and it is known that neighbouring territories are increasing their shipments. It is therefore imperative that growers concentrate on packing only the best quality fruit to prevent penalties arising from breakdown in transport, cool store and ripening room. In a great many cases, growers have planted areas too large for proper management and would obtain better returns if they reduced these by at least from one third to one half. The expanding use of fertilizers, fungicides and insecticides and the possible benefits of biological control are encouraging indications that Samoa will be able to maintain a high level of production in spite of the very serious threat of the Bunchy top virus disease. Only by concerted hard work and cooperation can this destructive disease be checked. In Samoa, strict

supervision by the Department, must be provided - and this is not possible without adequate funds!

In general the indications are that the Department will be required to face many problems of maintenance and development in 1961 with a budget curtailed below previous years' levels. In view of unavoidable increases in local travel and transport costs, the prospects of significant advances in field advisory and inspection work are not good; and any major reduction of these services from lack of materials or transport could result in a grave loss in efficiency and the breaking down of programmes built up over recent years. These services have not only proved acceptable to growers but have also been reflected in improved production.

Finally, the implementation of any part of the economic development plan could not well be undertaken under such circumstances. Notwithstanding the need to recognise current limiting factors, there is no doubt that energy, industry and courage whether in the villages, the plantations or in the Department exists at all levels to a degree which can be expected to meet the situation as successfully as the banana growers did in the past year!

"Onatutumau ai pea lava lea e le aunoa o ou lau'ele'ele ma lou manuia."

(B.E.V. PARHAM)
DIRECTOR OF AGRICULTURE
10/2/1961

REFERENCES

1. Director of Agriculture 1960. Department of Agriculture, Forests & Fisheries - Annual Report for 1959.

2. Secretary Copra Board 1961: - Copra Investigations - Samoa Bulletin 3. 2. 61.

LIST OF ILLUSTRATIONS

1. Cover (front) - Avele Farm Dairy.
2. Cover (inside) - Cauliflower (var. Pua kea)
3. Avele Agricultural College - Laboratory work.
4. " " " - cocoa pruning.
5. " " " - Livestock studies.

6 & 7. Fishing Trial - A.K. "Tradewinds"

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APPENDIX I

SUMMARY OF MONTHLY METEOROLOGICAL OBSERVATIONS *

1960

	Means of Temperature Max + Min / 2	Max	Min	Rainfall	Rain Days	Sunshine	Thunder	Light-ning	Monthly mean Humidity
				inches		hours			%
January	80.3	86.3	74.3	16.42	20	182.7	1	6	86
February	80.0	85.9	74.2	15.66	21	156.7	3	2	86
March	80.4	85.8	74.9	11.07	25	177.7	2	5	85
April	81.7	87.7	75.7	4.34	20	247.0	6	8	85
May	80.7	86.6	74.9	9.33	18	201.9	5	11	83
June	79.5	85.4	73.6	7.90	16	224.7	1	4	84
July	79.3	84.5	74.1	3.51	17	220.7		4	81
August	79.7	85.4	74.0	2.98	13	251.2			80
September	79.4	85.5	73.3	11.79	7	290.6	3	3	78
October	79.5	85.3	73.6	3.96	16	196.7	3	5	81
November	80.8	86.7	74.9	16.26	19	217.3	7	8	84
December	80.8	86.6	75.1	13.29	22	170.5	11	15	86
Year	80.2	86.0	74.4	106.51	214	2537.7	42	71	83
Departure from Normal	+0.7	+1.0	+0.4	-5.77	+13	-9.3			0.0

Rainfall: maximum daily fall 5.26" on 19th November

Wing: maximum gust recorded 52 knots from NNW on 27th January.

*By courtesy Officer-in-Charge - Apia Observatory.

APPENDIX 2

BANANA SHIPMENTS DURING THE YEAR, 1960
IN QUARTERLY SUMMARY

Cases Shipped	Cases Rejected				
	At Apia	At Salelologa	At Fagamalo	At W/Savai'i	Total
1. 138,027 c/s	2,975	87	62	263	3,387
2. 106,740 "	2,576	376	225	404	3,581
3. 146,205 "	3,030	640	192	208	4,070
4. 212,654 "	4,130	535	314	383	5,362
603,626 "	12,711	1,638	793	1,258	16,400

APPENDIX 3

SUMMARY OF COCOA SHIPMENTS TO VARIOUS DESTINATIONS
DURING THE YEAR, 1960

Destination	No.1	No.2	Nibs	Shells	Total
U.S.A.	355 T.	521 T.	0 T.	0 T.	= 876 Tons
New Zealand	157 T.	21 T.	45 T.	0 T.	= 223 "
London	1,208½ T.	528 T.	133 T.	159 T.	= 2,028½ "
Australia	259 T.	55 T.	0 T.	0 T.	= 314 "
Germany	113 T.	5 T.	0 T.	0 T.	= 118 "
Japan	8½ T.	0 0 T.	0 T.	0 T.	= 8½ "
Total Tons:	2,101 T.	1,130 T.	178 T.	159 T.	= 3,568 Tons

APPENDIX 4

SUMMARY OF COPRA SHIPMENTS TO VARIOUS DESTINATIONS
DURING THE YEAR, 1960

Destination	H.A.D.	No.1	No.2	Tokelau	Total
United Kingdom	5,343 T.	1,199 T.	1,091¾ T.	0 T.	= 7,633¾ Tons
New Zealand	2,495 T.	718 T.	586¼ T.	301 T.	= 4,100¼ "
U.S.A.	2,121 T.	547 T.	432 T.	0 T.	= 3,100 "
TOTAL	9,959 T.	2,464 T.	2,110 T.	301 T.	14,834 Tons

APPENDIX 5

EXPORT OF PRODUCE TO NEW ZEALAND

COFFEE:

Arabian	(lbs)	45
Liberian	(bags)	28 cwt

FRUIT (Fresh)

Avocado	(cases)	-
Bananas	(")	- 699
"	(Bchs)	- 13
Citrus	(cases)	- 276
Mangoes	(")	- 108
Pawpaws	(")	- 2,333
Pineapples	"	- 80
Polynesian Plums	(c/s)	7
Watermelons		- 1

NUTS & SPICES:

Annatto	(lbs)	- 170
Coconuts, husked	(sks)	246
" "	(c/s)	270
" whole		- 14
Nutmegs, whole	(bags)	15
" broken	(")	1
" Mace	(")	11

ROOT CROPS:

Ta'amu	(cases)	- 10
Taro	(")	- 1,163
Yams	(")	- 18

VEGETABLES (Fresh)

Capsicum	(cases)	- 30
Eggplant	(")	- 171

MISCELLANEOUS:

Banana chips dried	(lbs)	2240
Cotton seeds	(pg.)	1
Kapok	(bags)	- 41
Mats - Samoan	(bdle)	- 79
Mattresses		- 18
Oil, Samoan		- 9
Palusami	(tins)	- 29
Tapa	(bdle)	- 1
Taro, cooked	(bskt)	- 4
Tobacco leaf	(lbs)	- 6½

PLANTS AND SEEDS:

Hibiscus cuttings	(bdle) 4

EXPORT OF PRODUCE TO AMERICAN SAMOA

FRUIT (Fresh)

Avocado	(cases)	- 1
Bananas	(Bches)	- 4
"	(Sks)	- 266
Mangoes	(Bskts)	- 37
Oranges	(cases)	- 4
Pineapples	(")	- 29
Polynesian Plums	(bskts)	3
Watermelons		- 14

NUTS & SPICES:

Nuts	(sks)	- 52

ROOT CROPS:

Ta'amu	(sks)	- 316
Taro	(sks)	- 879
Yams	(bskts)	- 8

VEGETABLES:

Cabbages		- 13
Cucumbers		- 2
Peas		- 4
Sweet corn	(sk)	- 1
Tomatoes	(cs)	- 6
Vegetables (N.e.)	Bskts	24

MISCELLANEOUS:

Cocoa Beans	(sks)	- 9
Charcoal	(bskt)	- 1
Kapok fibre	(sks)	- 78
Kava roots	(bdl)	- 1
Mata (Samoan)		- 178
Mattresses	(bdl)	- 29
Oil (Samoan)	(bskts)	- 69
Mulberry	(sks)	- 1
Pandanus	(sks)	- 3
Sugarcane	(bdl)	- 9
Tapa	(bdl.)	- 2
Tobacco (Samoan)	(sai)	1

PLANTS & SEEDS:

Cocoa Pods		- 12
Sago palms		- 4

ANIMALS:

Pigs (cooked)		- 2

APPENDIX 6

IMPORTATION OF PRODUCE TO WESTERN SAMOA

Potatoes	-	1,124	Bags	Apples	-	773	cases
Onions	-	2,354	"	Pears	-	132	"
Garlic	-	26	"	Carrots	-	338	"
Rice	-	21,343	"	Parsnips	-	72	"
Wheat	-	552	"	Swedes	-	39	"
Sago	-	29	"	Lettuce	-	58	"
Corn	-	26	"	Celery	-	21	"
Dates	-	4	"	Leeks	-	7	"
Oats	-	51	"	Cauliflower	-	109	"
Chaff	-	49	"	Cabbage	-	477	"
Fowl Wheat	-	5	"	Beetroot	-	40	"
Split Pears	-	1	"	Tulips	-	2	"
Peanut in shells	-	62	"	Oranges	-	65	"
Nuts	-	59	"	Mix Vegetables	-	2	"
Blue Peas	-	1	"	Peas	-	4	"
Yellow split peas	-	1	"	Beans	-	1	"
Mats	-	67	Bdles	Cucumber	-	1	"
Mattresses	-	12	"	Yams	-	127	"
Maize	-	1	Kit	Soy Beans	-	1	"
Kava Roots	-	128	Pces.	Tongan Oil	-	49	"
Plants	-	5	bdles.	Silver Beets	-	2	"
Macadamia	-	2	only	Taros	-	22	"
Vegetable seeds	-	2	pcl.	Kumaras	-	10	"
Plants- Gladioli Cormes		48	only	Eggs	-	240	"
Pineapples	-	1	c/s	Rhubarb	-	1	"
Pears	-	6	"	Plums	-	40	"
Tomatoes	-	125	"	Apricots	-	19	"
Grapes	-	12	"	Peaches	-	10	"
				Melons	-	9	"

APPENDIX 7

COPRA AND COCOA LICENCES

A.	Undried Licences	54	=	£270. 0.0.
	Copra "	460	=	230. 0.0.
	Cocoa "	416	=	104. 0.0.
		930	=	£604. 0.0.

SUMMARY OF COURT PROCEEDINGS

B.	Cocoa	54	=	£190.10. 0.
	Copra	72	=	247.10. 0.
	Noxious Weeds	37	=	55. 0. 0.
	Bunchy Top	21	=	12.10. 0.
	Rhinoceros Beetle	68	=	138. 0. 0.
	P/W/O/L	3	=	6. 0. 0.
	Total:	226 C/cases		£648.10.0.

APPENDIX 8

DEVELOPMENT OF EXPORT CROPS
(See para. 98)

In the course of assisting the development of new plantings the Department suppressed the distribution and planting of the following plant material as follows:

Village	Growers	Poumuli	Cocoa	Coffee	M/Hemp	Coconut
Salamumu	74	110	1,700	460	406	-
Si'umu	48	400	2,225	3,300	300	-
Lepā	110	400	1,000	1,000	565	-
Fogātuli	-	-	604	651	712	-
Lauli'i	-	-	-	280	-	-
Mulivai	1	-	200	500	-	-
Leulumoega	4	-	200	-	-	-
Si'umu	1	100	-	-	-	-
Amaile	1	98	100	-	13	-
Samusu	1	97	100	-	12	-
Afega	1	200	-	-	-	-
Lepā	1	-	100	-	-	-
Moamoa	1	200	-	-	-	-
Lepale	1	-	-	-	10	-
Si'umu	1	300	-	500	-	-
Eva	1	100	200	-	10	-
Sataua, Savai'i	1	-	-	-	20	-
Moata'a	13	-	-	-	-	-
Matautu	2	-	-	-	-	100
Magiagi	1	-	-	-	-	50
Apia	3	-	-	-	-	150
Vaiala	11	-	-	-	-	550
Papalaulelei Pu'apu'a	1	-	-	-	-	100
TOTAL:		2,005	6,429	6,691	2,048	2,000

APPENDIX 9

PLANT INTRODUCTIONS - 1960

(See para 76)

The following is a list of 185 parcels of seeds plants and cuttings introduced from overseas or collected from local sources within the Territory and registered at Nafanua for study, propagation and later distribution. The first column gives the W.Samoa Department of Agriculture Number, the second the scientific name and family with notes on uses and the third, the common name where known.

WSDA No.	DESCRIPTION AND ORIGIN		COMMON NAME
4894 & 5	From ENGLAND, seeds donated by L.Goodman Esq. FRCS - received 20.1.60.		
	4894 - Ipomoea alba L. A large climbing plant with white perfumed flowers - opening at night. First introduction.	Convolvulaceae	MOON FLOWER
	4895 - Lycopersicon esculentum L. var. AILSA CRAIG - a white fruited type. For previous introduction see No. 4839.	Solanaceae	TOMATO
4896	From FIJI, Conservator of Forests, seeds received 20.1.60. Terminalia superba First introduction, large forest tree from Africa.	Combretaceae	TIMBER TREE
4897	From FIJI, Department of Agriculture plants from J.W.Parham Esq. Botanist received 18.2.60. Ischaemum timorense First introduction - pasture grass native of Timor	Gramineae	LUKUNTU GR
4898 - 9	From W.SAMOA, Upolu, plants collected by Field Staff - received 19.2.60 and 2.3.60 respectively - and planted at Nafanua. Broussonetia papyrifera (Vent)L. First introduction.	Moraceae	PAPER MULB
4900 - 3	From PUERTO RICO, U.S.D.A. Plant Introduction Service, two plants of each species received 16.3.60 and planted at Nafanua. For previous introduction see		
	4900 - Bambusa dissemulator	Gramineae	BAMBOO
	4901 - B. pervariabilis	DO	
	4902 - B. tulda Roxb.	do	
	4903 - Melocanna baccifera	do	
4904	From UPOLU, Apia plants donated by Mrs L. Bairstow received 26.3.60. (Ker-Gawl) Spraque		
	Neomarica caerulea (Ker-Gawl) Sprague Ornamental iris-like plant with blue and yellow flowers. First introduction.	Iridaceae	MARICA
4905	From TAHITI, seeds presented by Mr Fritz Betham received 13.4.60. First introduction.		
	Pistachia vera L.	Anacardiaceae	PISTACHIO

PISDA No.	Description		Common Name
4906 - 8	From INDIA, New Delhi Agricultural Research Station per Plant Introduction officer, South Pacific Commission Seeds received 13.4.60.		
	Cajanus cajan (L.) Millsp.	Leguminosae	PIGEON PEA
4906	Var. N.P.24		
4907	" " var. NP(WR)15.		do.
	For previous introduction see 4400		
4908	Vigna sinensis (L) Endl. var. PUSA BARSATI	Leguminosae	COWPEA
	For previous introduction see No.4746.		
4909	From ISRAEL, seeds donated by L.Goodman Esq. FRCS, received 13.4.60		
	Cucumis melo L.	Cucurbitaceae	MELON
	For previous introduction see No. 4683.		
4910	From NORTH BORNEO, Director of Agriculture, seeds received 27.4.60.		
	Theobroma cacao L. var. AMELONADO	Sterculiaceae	COCOA
	For previous introduction see No. 4818.		
4911-13	From W.SAMOA, Upolu plants collected at Alaoa by B.E.V.P. for trial at Nafanua - received 5.5.60		
4911	Alysicarpus vaginalis (L) DC.	Leguminosae	ONE-LEAF C...
4912	Desmodium unciniatum (Jacq) DC	do	SPANISH "
4913	Phascolus lathyroides L.	do	
	All above were first introductions of useful fodder plants.		
4914	From FIJI, Conservator of Forests, seeds received 6.5.60.		
	Gmelina arborea L.	Verbenaceae	YEMANE
	For previous introduction see No. 4751		
4915	From W.SAMOA, Seeds collected at Alaoa received 6.5.60.		
	Desmodium triflorum (L) DC	Leguminosae	
	A prostrate 3-leafed legume - not common but useful in pasture. First introduction.		
4916-18	From W.SAMOA, Upolu - Seeds collected B.E.V.P. received 18.6.60.		
4916	- Plumeria rubra L.	Apocynaceae	RED FRANGIPANI
4917	- Sizygium corynocarpum A.Gray Tree native of Samoa.	Myrtaceae	ASI
4918	- Not identified - Winged seeds		
4919	From W.SAMOA, Savai'i, seeds collected by Field Officer G.duSeigneur, received 18.6.60		
	Scaevola frutescens (Millsp) Krause	Goodeniaceae	
	Shrub native of Samoa common only in Savaii leaves and roots medicinal - pith well developed. Plant under investigation overseas. First introduction to Nafanua.		
4920	From FIJI, Botanist Department of Agriculture Mr J.W.Parham, cuttings received 23.6.60.		
	Tripsacum laxum Nash	Gramineae	GUATEMALA
	Large fodder grass - native of C. America For previous introduction (failed) see No. 4826.		

WSDA No.	Description		Common Name
4921	From SAMOA, Papauta, cuttings collected B.E.V.P. received 23.6.60.		
	Evodia hortensis J & G. Forst	Rutaceae	USI
	For previous introduction see No.4813.		
4922	From NEW CALEDONIA, South Pacific Commission Plant Introduction officer, seeds received 10.8.60 - (SPC 1105) now recorded.		
	Serianthes calycina Benth.	Leguminosae	
	A very large forest tree - timber useful		
	For previous introduction (failed) see No.4837.		
4923	From W.SAMOA, Upolu cuttings collected B.E.V.P. at Lana - received 10.8.60.		
	Piper methysticum Forst.	Piperaceae	'AVA
4924	From QUEENSLAND per Mrs J.G. Miedecke, seeds received 12.6.60.		
	Macadamia ternifolia F. Muell	Proteaceae	QUEENSLAND
	For previous introduction see No.4893		
4925-26	From W.SAMOA, Upolu, plants collected by Field Staff - received 12.6.60.		
	Broussonetia papyrifera (L) Vent	Moraceae	PAPER MULBERRY
	4925 - For previous introduction see No.4899		
	4926 - " " " " " 4925		
4927-32	From TAHITI, Department of Agriculture, root cuttings received 21.8.60.		
	Artocarpus altilis (Parkins) Fosb.	Moraceae	BREADFRUIT
	For previous introduction see No. 4874		
	4927 - var. ARAVE - 6 roots		
	4928 - " MAMOA - 6 "		
	4929 - " MAMAHA - 6 "		
	4930 - " MAMI - 13 "		
	4931 - " PAIA - 12 "		
	4932 - " PETI - 11 "		
4933-37	From TAHITI, Department of Agriculture, cuttings received 21.8.60 planted at Nafanua.		
	Vanilla planifolia Andrs.	Orchidaceae	VANILLA
	For previous introduction see No.4580.		
	4933 - var. HAAPAPE - 4 cuttings		
	4934 - " MOOREA - 4 "		
	4935 - " POTITI - 4 "		
	4936 - " TIAREI - 4 "		
	4937 - " VAIRAO - 4 "		
4938-41	From U.S.A., HAWAII, Seeds purchased from Honolulu Seed Company, received 30.8.60.		
	4938 - Brassica oleracea L. var. botrytis - SNOWBALL	Cruciferae	CAULIFLOWE
	For previous introduction see No. 4777		
	4939 - Lactuca sativa L. var. MANOA SPECIAL	Compositae	LETTUCE
	For previous introduction see No. 4688		
	4940 - Lycopersicum esculentum L. var. PRITCHARD	Solanaceae	TOMATO
	For previous introduction see No.4895.		
	4941 - Solanum melongenum	Solanaceae	EGGPLANT
	For previous introduction see No. 4694		

WSDA No.	Description		Common Name
4942-51	From TAHITI - Dept. of Agriculture, root cuttings received 4.9.60, and planted at Nafanua.		
	Artocarpus altilis (Parkins) Fosb.	Moraceae	BREADFRUIT
	For previous introduction see No. 4932		
	4942 - var. ATIATI		
	4943 - var. FIRIKIKI		
	4944 - var. HUERO		
	4945 - var. MAHOI		
	4946 - var. PAEA		
	4947 - var. PUPU		
	4948 - var. RARE MAHOI		
	4949 - var. RAUMAI		
	4950 - var. TUUTOU		
	4951 - var. VAI PAERE		
4952-6	From COOK ISLANDS, Aitutaki, districts Anutago and Ureia, root cuttings rec'd. from the Resident Commissioner on 6th Sept. 1960.		
	Artocarpus altilis (Parkins) Fosb.	Moraceae	BREADFRUIT
	4952 & 3 - var. KURUENUA		
	4954 & 5 - var. KURU PATEA		
	4956 - var. KURU RUTUMA		
	All local varieties of this valuable tree. For previous introduction see No.4951		
4957	From FIJI - cuttings from Mrs L.M.Cook, received May 1959 and now recorded for first time.		
	Justicia betonica L.	Acanthaceae	SQUIRREL'S TAIL
	Ornamental shrub up to 6' high with erect racemes of white flowers, native of C. America. Special interest since found at Nafanua to be a favoured food plant of the Zanzibar wasp Scolia ruficornis - a parasite of the rhinoceros beetle of coconuts (Oryctes) First introduction.		
4958-60	From Upolu, roots collected by Staff of Department received 6/9/60.		
	Artocarpus altilis (Parkins) Fosb.	Moraceae	BREADFRUIT
	For previous introduction see No.4956.		
4961	From Upolu, Vaimea, seeds presented by Mrs F.G.D.Betham received on 129.60.		
	Luffa cylindrica (L) M.Roem	Cucurbitaceae	SPONGE COURD
	For previous introduction see No.4422.		
4962-64	From AMERICAN SAMOA, Director of Agriculture rooted plants (bamboos) received 15 Sept. and planted at Nafanua. All first introdn.		
	4962 - Bambusa polymorpha		BAMBOO
	4963 - Dendrocalamus aspera		do
	4964 - Guadua angustifolia		do
	Additions to the bamboo collection.		

WSDA No.	Description		Common Name
4965	From Upolu, plants received from Dr R.W.D.Maxwell in November 1956 now entered in register.		
	Bambusa vulgaris Schrad & Wendl. var. Tall growing bamboo, stems strong, yellow with green stripes useful for many purposes, naturalized in W.Samoa.		VARIEGATED BAMBOO (OFE PAPALAGI)
4966	From Upolu, Seeds presented by Mrs L.Bairstow Apia, received on 26 September.		
	Cassia grandis L.	Leguminosae	PINK SHOWER
	For previous introduction see 4622.		
4967-69	From NETHERLANDS, New Guinea, Asei district plants sent by Mr Coenen Asst. Plant Introduction Officer S.P.C. by air mail received 28th September.		
	Artocarpus altilis (Parkins) Fosb.	Moraceae	BREADFRUIT (ULU)
	4967 - var. HAKANANOGO		
	4968 - " ISEISA		
	4969 - " OBAWN		
	All the above varieties represent first introductions - for previous introduction of the species see No.4960.		
4970	From MANONO ISLAND, plants collected by Field Inspector (Pulefa'atoaga) Futi Mikaele, received on 28 September.		
	Broussonetia papyrifera L.	Moraceae	PAPER MULBERRY (U'A)
	For previous introduction see No.4926.		
4971-77	From NETHERLANDS, New Guinea, plants received from Mr Coenen Asst. Plant Introduction officer, S.P.C. on 7 Oct. 1960.		
	Artocarpus altilis (Parkins) Fosb.	Moraceae	BREADFRUIT
	4971 - var. ANINTA DOEA		
	4972 - " ANINTA SATU		
	4973 - " ATU		
	4974 - " ENUA		
	4975 - " MORAVA		
	4976 - " PUERO TAHITI		
	4977 - " TAVAREVARE LATE		
	All the above varieties represent first introductions. For previous introduction of the species see No.4969.		
4978-95	From TONGA, plants collected by Mr J.W.Parham Acting Plant Introduction officer S.P.C. received on 13 October 1960. For previous introduction see No.4977.		
	Artocarpus altilis (Parkins) Fosb.	Moraceae	BREADFRUIT ('ULU)
	4978 - var. AVELOLOA		
	4979 - " KALOU		
	4980 - " KEA FATU		
	4981 - " KEA LOUTOKA		
	4982 - " KEA TALA		
	4983 - " KEA TALA VAI		
	4984 - " LOUTOKA		
	4985 - " LOUTOKA KAUNONOU		
	4986 - " LOUTOKA KULUFAU		
	4987 - " LOUTOKA LAUMOA		
	4988 - " LOUTOKA MA'AMA'A		

WSDA No.	Description		Common Name
4989	- var. LOUTOKA NOKONOKO		
4990	- " LOUTOKA VAHIVAHI		
4991	- " MA'AFALA		
4992	- " MA'OFALA KAUIKI		
4993	- " MAOPO VAI		
4994	- " PUOU VAI		
4995	- " ULUSINA		
4996-5022	From W.SAMOA, plants collected by Messrs J.W.Parham, Acting Plant Introduction Officer, S.P.C., V.A.T.Leavasa and other officers of Agricultural Department during a survey in Upoly, Savai'i and Manono Is. received 25 October 1960. For previous introduction see No.4995.		
	Artocarpus altilis (Parkins) Fosb.	Moraceae	BREADFRUIT ('ULU)
4996	- var. ULU SINA		
4997	- " ULU SINA		
4998	- " SAGOSAGO		
4999	- " AVELOLOA		
5000	- " TALA		
5001	- " MAOPO		
5002	- " GUTUFAGU		
5003	- " MA'A		
5004	- " E'A		
5005	- " MOAMOALEGA		
5006	Artocarpus integer ULU INITIA First introduction of this locally rare species.		JACK FRUIT
	Artocarpus altilis (Parkins) Fosb.		BREADFRUIT
5007	- var. ULU EA		
5008	- " ULU FAU		
5009	- " FEFELO		
5010	- " GUTUFAGU		
5011	- " MA'A		
5012	- " MA'AFALA		
5013	- " MOAMOALEGA		
5014	- " PETI		
5015	- " SINA		
5016	- " TALA		
5017	- " TUITU		
5018	- " ULU 'A'		
5019	- " ULU 'B'		
5020	- " ULU 'C'		
5021	- " NIUMOLI		
5022	- "		
5023-43	From IVORY COAST, Seeds collected by B.E.V.P. received on 14.11.60.		
5023	Bixa orellana L. var. A conspicuous fruited variety with large bright orange red capsules. For previous introduction see No.4519.	Bixaceae	ANNATTO (LOA)
5024	Citrus nobilis Lour. For previous introduction see No.4819	Rutaceae	MANDARIN-ORANGE
5025 & 6	Citrus sinensis osbeck For previous introduction see No.4634	Rutaceae	ORANGE
5027	Cola acuminata Schott & Endl. For previous introduction see No.4635.	Sterculiaceae	KOLA

WSDA No.	Description		Common Name
5028	Spondias dulcis Forst. For previous introduction see No.4399	Anacardiaceae	POLYNESIAN PLUM (VI)
5029	Artocarpus altilis (Parkins) Fosb. var. seminifera. A seeded variety not previously introduced.	Moraceae	BREADFRUIT
5030	Musa cavandishii Lamb var. One sucker of locally grown commercial form of Lacatan groups. First introduction of variety, said to be originally from Guadeloupe.	Musaceae	BANANA (FA
5031	Species unknown From ORSTOM Research Station.	Leguminosae	TREE
5032	- Unknown tree of large size with winged woody pods.	Leguminosae	
5033	Pachira edulis First introduction. Tree	Bombacaceae	SABA NUT
5034	Persea americana Mill var. BAUER. For previous introduction see No.4749	Louraceae	AVOCADO
5035	Capsicum frutescens L. Small fruited variety not previously introduced.	Solanaceae	BIRD'S EYE PEPPER
5036	Melia sp. Small tree	Meliaceae	
5037	Ischaemum indicum Merr. For previous introduction see No.4587	Gramineae	PASTURE GRASS
5038	Stenotaphrum secundatum (Walt.)Ktze. Variegated variety for lawns, not previously introduced.	Gramineae	ST.AUGUSTINE'S GRAS
5039	Crotolaria sp. First introduction.	Leguminosae	RATTLE POD
5040	Crotolaria sp.	do.	do.
5041	Tephrosia noctiflora Bojer.	do.	do.
5042	Crotolaria atrorubens	do.	
5043	Teprosia vogelii Hook.	do.	
5044-5	From HAWAII ISLAND, presented by Mr and Mrs L.W.Wishard, per B.E.V.P. cuttings and seeds received 14 November. Bougainvillea spectabilis Willd,		BOUGAINVIL
5044	f. White		
5045	f. Orange		
5046	f. Pale pink		
5047	f. Bright Pink.		

WSDA No.	Description		Common Name
5048-52	From HAWAII ISLAND, collected B.E.V.P. received 14 November.		
5048	Coffea arabica L.f. KATURRA	Rabiaceae	ARABIAN COFFEE
5049	" " f. KONA	do	
5050	" " f. BOURBON	do	
5051	" " f. N.S.	do	
5052	Macadamia ternifolia F.Muell	Proteaceae	QUEENSLAND NUT
5053-59	From HAWAII ISLAND, cuttings presented by Mr and Mrs L.W.Wishard Kamuela per B.E.V.P. received 14 November 1960.		
5053-6	Gardenia jasminoides Ellis. var. Four varieties - for introduction see No. 4758	Rubeaceae	GARDENIA
5057-8	- First introduction of this beautiful ornamental herb.	Zingiberaceae	BLUE GINGER
5059	Dendrobium sp. First introduction of this ornamental species.	Orchidaceae	ORCHID
5060-69	From HAWAII, Honolulu, plants purchased from Otto Kirsch donated by B.E.V.P. received 14 November. All first introductions.		
5060	Vanda sanderiana x Faustii f. Betsy summer	Orchidaceae	VANDA ORCHID (Hybrid)
5061			
5062	Vanda monacensis x sanderiana f. Oscar Kirsch		do
5063	Vanda monacensis x manila f. Mary L. Midriff.		do
5064	Vanda manila x Clara G & L Fisher f. Yolande		do
5065-6	Vanda hybrids		do
5069	Cattyleya Joan Manoa x Jean Borrow f. Josephine.		CATTLE ORCHID
5070-77	From HAWAII ISLAND, presented by Mr & Mrs L.W.Wishard cuttings received per B.E.V.P. 14 November.		
5070	Epidendrum sp.	Orchidaceae	
5071-6	Plumeria acuminata Ait. six varieties of this ornamental tree not previously introduced.	Apocynaceae	FRANGIPANI (PUA FITI)
5077	Calotropis sp. First introduction of this blue flowered species with large inflated fruits.	Asclepiadaceae	CROWN FLOWER

WSDA No.	Description		Common Name
5078	From U.S.A. Los Angeles, presented by Mrs Howard G. Macmillan - cuttings per B.E.V.P. received 14 November 1960. Epiphyllum? ackermanii Haw. First introduction	Cactaceae	RED FLOWERED CACTUS
3079	From IVORY COAST, Abidjan cutting collected B.E.V.P. received 14 Nov. Cereus jamaicensis First introduction of this handsome shrub - grown as a hedge.	Cactaceae	CANDELABRA CACTUS
5080-5092	From ROTUMA ISLAND, Botanist Fiji Dept. of Agriculture, Mr J.W.Parham, root cuttings received 18 November 1960. Artocarpus altilis (Parkin) Fosb.	Moraceae	BREADFRUIT
	5080 - var. ULUFITI		
	5081 - " FURAU		
	5082 - " KAUMAGA		
	5083 - " MAHALU		
	5084 - " MAKEVA		
	5085 - " MANOMA		
	5087 - " PULUPULU		
	5088 - " REUJE IJE		
	5089 - " RAULULU		
	5090 - " UL ROTUMA		
	5091 - " " SAMOA		
	5092 - " " SEMANTEFHIL		
5093-96	From HAWAII, Honolulu plants purchased from Oscar Kirsch presented B.E.V.P. received 24th December. Anthurium andraeanum Lindl.	Aroidaceae	ANTHURIUM LILY
	5093 f. DARK RED		
	5094 f. ORANGE		
	5095 f. WHITE		
	5096 f. PINK		
5097-9	From UPOLU, Apia plants presented by Mrs C. Marsack recorded 28 Dec. 1960.		
	5097 Murraya exotica L. Small tree native of India, useful hedge plant.	Rutaceae	MOCK ORANGE
	5098 Quassia amara L. Shrub with red flowers - ornamental. Extract used as insecticide.	Simarubaceae	SURINAM QUASSIA W
	5099 Alocasia sanderiana Bull. Native of Philippines - leaves wavy - white margined and veined, shiny green above, reddish purple below.		ALOCASIA

APPENDIX 10

FARM SERVICES. WEED CONTROL AND COCOA

1. Weed Control 1960:

This work has been concentrated on the three most widespread weeds, namely elephant's foot, giant mimosa and Honolulu rose. There is little interest shown by landholders in eradication of these noxious weeds, except in those areas where they are a nuisance in crops.

During the year the following areas have been sprayed:

A : WEED CONTROL FARM SERVICES AND DEMONSTRATIONS - 1960

Land Owners		Area (sq.ch)	Chemicals (oz.)			
Localities	Number		M.C.P-4	2.4-D	2,4,5-T	Borascu lbs.
Village	40	62	1,168	30	-	-
Estates	15	155	822	222	118	-
Government	6	30	168	-	-	28
Domonstrations (free)	9	31	36	320	27	-
TOTALS	70	278	2,409	592	145	28

2. Cocoa Pruning and Spraying Demonstrations and Field services for pruning, spraying and fertilizers were carried out as follows:

B : COCOA DEMONSTRATION & FARM SERVICES

Land Owners		No. of Trees		Chemicals Used (lbs)	
Locality	Number	Pruned	Sprayed	Copper sulphate	Lime
a) Free Demonstrations					
Village	21	1,485	1,602	266	538
Estates	6	430	490	164	227
Mission	10	180	-	-	-
b) Operations paid					
-	3	-	1,165	272	356
Totals:	31	2,095	3,257	702	921

Demonstration on a smaller scale where one or two field inspectors have demonstrated pruning of a few trees during an extension services visit and whilst on banana inspection are not included in these figures. This work is much appreciated by planters and many repeat visits have been made to show the effectiveness of the spraying for Black pod control.